DOCUMENT RESUME

ED 422 310 SP 038 105

TITLE	Guidelines for School and Community Programs To Promote Lifelong Physical Activity among Young People. Morbidity and Mortality Weekly Report: Recommendations and Reports.
INSTITUTION	Centers for Disease Control and Prevention (DHHS/PHS), Atlanta, GA.
PUB DATE	1997-03-07
NOTE	43p.
AVAILABLE FROM	Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325.
PUB TYPE	Collected Works - Serials (022) -- Guides - Non-Classroom (055)
JOURNAL CIT	MMWR; v46 nRR-6 Mar 7 1997
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Community Programs; *Comprehensive School Health Education; Curriculum Development; Educational Environment; Educational Policy; Elementary Secondary Education; Extracurricular Activities; Faculty Development; *Health Promotion; Life Style; *Lifetime Sports; Parent Participation; *Physical Activities; Physical Activity Level; *Physical Education; School Health Services; Student Attitudes; Student Behavior; Students
IDENTIFIERS	Health Behavior

ABSTRACT

This report summarizes recommendations for encouraging physical activity among young people so they will continue to engage in physical activity in adulthood and obtain the benefits of physical activity throughout life. The guidelines are based on an in-depth review of research, theory, and current practice in physical education, exercise science, health education, and public health. These guidelines include 10 recommendations for school and community programs: (1) establish policies that promote enjoyable, lifelong physical activity; (2) provide physical and social environments that encourage and enable safe, enjoyable physical activity; (3) implement physical education curricula and instruction that emphasize enjoyable physical activity participation and help students develop knowledge, attitudes, motor skills, behavioral skills, and confidence to adopt and maintain physically active lifestyles; (4) implement health education curriculum and instruction that help students develop knowledge, attitudes, behavioral skills, and confidence to adopt and maintain physically active lifestyles; (5) provide extracurricular physical activity programs that meet the needs and interests of all students; (6) include parents/guardians in physical activity instruction and planning; (7) provide appropriate training for education, coaching, recreation, health care, and other school and community personnel; (8) assess students' physical activity patterns, offering counseling and referrals; (9) provide a range of developmentally appropriate community sports and recreation programs; and (10) regularly evaluate school and community physical activity instruction, programs, and facilities. (Contains 276 references.) (SM)

CDC

March 7, 1997 / Vol. 46 / No. RR-6

MMWR

MORBIDITY AND MORTALITY WEEKLY REPORT

Recommendations and Reports

ED 422 310

Guidelines for School and Community Programs to Promote Lifelong Physical Activity Among Young People

Reprinted November 1997

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control and Prevention (CDC)
Atlanta, Georgia 30333

The *MMWR* series of publications is published by the Epidemiology Program Office, Centers for Disease Control and Prevention (CDC), Public Health Service, U.S. Department of Health and Human Services, Atlanta, GA 30333.

SUGGESTED CITATION

Centers for Disease Control and Prevention. Guidelines for school and community programs to promote lifelong physical activity among young people. MMWR 1997;46(No. RR-6):[inclusive page numbers].

Centers for Disease Control and Prevention ..... David Satcher, M.D., Ph.D.
Director

The material in this report was prepared for publication by:

National Center for Chronic Disease Prevention and Health Promotion ..... James S. Marks, M.D.
Director

Division of Adolescent and School Health ..... Lloyd J. Kolbe, Ph.D.
Director

Division of Nutrition and Physical Activity ..... Frederick L. Trowbridge, M.D.
Director

The production of this report as an *MMWR* serial publication was coordinated in:

Epidemiology Program Office ..... Stephen B. Thacker, M.D., M.Sc.
Director

Richard A. Goodman, M.D., M.P.H.
Editor, MMWR Series

Office of Scientific and Health Communications (proposed)

Recommendations and Reports ..... Suzanne M. Hewitt, M.P.A.
Managing Editor

Elizabeth L. Hess
Project Editor

Morie M. Higgins
Visual Information Specialist

Use of trade names and commercial sources is for identification only and does not imply endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

Contents

Introduction 1
Physical Activity, Exercise, and Physical Fitness 2
Health Benefits of Physical Activity and Physical Fitness 3
Recommended Physical Activity for Young People 3
Prevalence of Physical Activity Among Young People 3
Factors Influencing Physical Activity 4
Objectives for Physical Activity Among Young People 4
Rationale for School and Community Efforts to Promote Physical Activity Among Young People 5
Recommendations for School and Community Programs Promoting Physical Activity Among Young People 6
Conclusion 24
References 24
Appendix A: Physical Activity Information Resource List 36

Copies can be purchased from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325. Telephone: (202) 783-3238.

Single copies of this document are available from the Centers for Disease Control and Prevention, National AIDS Clearinghouse, P.O. Box 6003, Rockville, MD 20850. Telephone: (800) 458-5231.

Technical Advisors for Guidelines for School and Community Programs to Promote Lifelong Physical Activity Among Young People

Tom Baranowski, Ph.D.
M.D. Anderson Cancer Center
University of Texas
Houston, TX

Oded Bar-Or, M.D.
McMaster University
Hamilton, Canada

Steven Blair, P.E.D.
Cooper Institute for Aerobics Research
Dallas, TX

Charles Corbin, Ph.D.
Arizona State University
Tempe, AZ

Marsha Dowda, M.S.P.H.*
University of South Carolina
Columbia, SC

Patty Freedson, Ph.D.
University of Massachusetts
Amherst, MA

Russell Pate, Ph.D.*
University of South Carolina
Columbia, SC

Sharon Plowman, Ph.D.
Northern Illinois University
De Kalb, IL

James Sallis, Ph.D.
San Diego State University
San Diego, CA

Ruth Saunders, Ph.D.*
University of South Carolina
Columbia, SC

Vernon Seefeldt, Ph.D.
Michigan State University
East Lansing, MI

Daryl Siedentop, P.E.D.
Ohio State University
Columbus, OH

Bruce Simons-Morton, Ed.D., M.P.H.
National Institute for Child Health and Human Development
Bethesda, MD

Christine Spain, M.A.
President's Council on Physical Fitness and Sports
Washington, DC

Marlene Tappe, Ph.D.*
Centers for Disease Control and Prevention
Atlanta, GA

Dianne Ward, Ed.D.*
University of South Carolina
Columbia, SC

*Assisted in the preparation of this report.

Participating Agencies and Organizations

American Academy of Kinesiology and Physical Education
American Academy of Pediatrics
American Alliance for Health, Physical Education, Recreation, and Dance
American Association for Active Lifestyles and Fitness
American Association for Health Education
American Association for Leisure and Recreation
American Association of School Administrators
American College of Sports Medicine
American Federation of Teachers
American Heart Association
American Medical Association
American Public Health Association
American School Health Association
Council of Chief State School Officers
Council for Exceptional Children
Indian Health Service (U.S. Department of Health and Human Services [USDHHS])
National Association of Elementary School Principals
National Association for Girls and Women in Sport
National Association of Governor's Councils on Physical Fitness and Sports
National Association of Physical Education in Higher Education
National Association of Secondary School Principals
National Association for Sport and Physical Education
National Association of State Boards of Education
National Congress of Parents and Teachers
National Dance Association
National Education Association
National Handicapped Sport and Recreation Association
National Heart, Lung, and Blood Institute (USDHHS)
National Institute for Child Health and Human Development (USDHHS)
National Institute of Mental Health (USDHHS)
National Recreation and Parks Association
National School Boards Association
National School Health Education Coalition
President's Council on Physical Fitness and Sports
Society of State Directors of Health, Physical Education, and Recreation
U.S. Department of Education
U.S. Office of Disease Prevention and Health Promotion (USDHHS)
Young Men's Christian Association of the United States of America
Young Women's Christian Association

Guidelines for School and Community Programs to Promote Lifelong Physical Activity Among Young People

Summary

Regular physical activity is linked to enhanced health and to reduced risk for all-cause mortality and the development of many chronic diseases in adults. However, many U.S. adults are either sedentary or less physically active than recommended. Children and adolescents are more physically active than adults, but participation in physical activity declines in adolescence. School and community programs have the potential to help children and adolescents establish lifelong, healthy physical activity patterns.

This report summarizes recommendations for encouraging physical activity among young people so that they will continue to engage in physical activity in adulthood and obtain the benefits of physical activity throughout life. These guidelines were developed by CDC in collaboration with experts from universities and from national, federal, and voluntary agencies and organizations. They are based on an in-depth review of research, theory, and current practice in physical education, exercise science, health education, and public health.

The guidelines include recommendations about 10 aspects of school and community programs to promote lifelong physical activity among young people: policies that promote enjoyable, lifelong physical activity; physical and social environments that encourage and enable physical activity; physical education curricula and instruction; health education curricula and instruction; extracurricular physical activity programs that meet the needs and interests of students; involvement of parents and guardians in physical activity instruction and programs for young people; personnel training; health services for children and adolescents; developmentally appropriate community sports and recreation programs that are attractive to young people; and regular evaluation of physical activity instruction, programs, and facilities.

INTRODUCTION

In recent years the public health benefits of reducing sedentary lifestyles and promoting physical activity have become increasingly apparent (*1–8*). The Surgeon General's report on physical activity and health emphasizes that regular participation in moderate physical activity is an essential component of a healthy lifestyle (*1*). Although regular physical activity enhances health and reduces the risk for all-cause mortality (*9–18*) and the development of many chronic diseases among adults (*10,12–14,17,19–45*), many adults remain sedentary (*46*). Although young people are more active than adults are (*1*), many young people do not engage in recommended levels of physical activity (*47,48*). In addition, physical activity declines precipitously with age among adolescents (*47,48*). Comprehensive school health programs have the potential to slow this age-related decline in physical activity and help students establish lifelong, healthy physical activity patterns (*49,50*).

This report is one in a series of CDC documents that provide guidelines for school health programs to promote healthy behavior among children and adolescents (*51–53*). These physical activity guidelines address school instructional programs, school psychosocial and physical environments, and various services schools provide. Because the physical activity of children and adolescents is affected by many factors beyond the school setting, these guidelines also address parental involvement, community health services, and community sports and recreation programs for young people.

The guidelines are written for professionals who design and deliver physical activity programs for young people. At the local level, teachers and other school personnel, community sports and recreation program personnel, health service providers, community leaders, and parents may use the guidelines to promote enjoyable, lifelong physical activity among children and adolescents. Policymakers and local, state, and national health and education agencies and organizations may use them to develop initiatives that promote physical activity among young people. In addition, personnel at postsecondary institutions may use these guidelines to train professionals in education, public health, sports and recreation, and medicine.

CDC developed these guidelines by reviewing published research; considering the recommendations in national policy documents; convening experts in physical activity; and consulting with national, federal, and voluntary agencies and organizations. When possible, these guidelines are based on research; however, many are based on behavioral theory and standards for exemplary practice in physical education, exercise science, health education, and public health. More research is needed on the relationship between physical activity and health among young people, the relationship between physical activity during childhood and adolescence and that during adulthood, the determinants of physical activity among children and adolescents, and the effectiveness of school and community programs promoting physical activity among young people.

PHYSICAL ACTIVITY, EXERCISE, AND PHYSICAL FITNESS

Distinctions between physical activity, exercise, and physical fitness are useful in understanding health research. Physical activity is "any bodily movement produced by skeletal muscles that results in energy expenditure.... Exercise is a subset of physical activity that is planned, structured, and repetitive" and is done to improve or maintain physical fitness. Physical fitness is "a set of attributes that are either health- or skill-related." Health-related fitness includes cardiorespiratory endurance, muscular strength and endurance, flexibility, and body composition; skill-related fitness includes balance, agility, power, reaction time, speed, and coordination (*54*).

Specific forms of physical activity and exercise in which young people might participate include walking, bicycling, playing actively (i.e., unstructured physical activity), participating in organized sports, dancing, doing active household chores, and working at a job that has physical demands. The places or settings in which young people can engage in physical activity and exercise include the home, school, playgrounds, public parks and recreation centers, private clubs and sports facilities, bicycling and jogging trails, summer camps, dance centers, and religious facilities.

HEALTH BENEFITS OF PHYSICAL ACTIVITY AND PHYSICAL FITNESS

Regular moderate physical activity results in many health benefits for adults. For example, it improves cardiorespiratory endurance, flexibility, and muscular strength and endurance (*1,55*). Physical activity may also reduce obesity (*56–60*), alleviate depression and anxiety (*61–65*), and build bone mass density (*66–71*). Physically active and physically fit adults are less likely than sedentary adults to develop the chronic diseases that cause most of the morbidity and mortality in the United States: cardiovascular disease (*10,12–14,17,19–29,72–77*), hypertension (*30–32,78*), non-insulin-dependent diabetes mellitus (*33–37*), and cancer of the colon (*38–45*). All-cause mortality rates are lower among physically active than sedentary people (*9–18*).

Although more research is needed on the association between physical activity and health among young people (*79–81*), evidence shows that physical activity results in some health benefits for children and adolescents. For example, regular physical activity improves aerobic endurance (*82–86*) and muscular strength (*82,86*). Among healthy young people, physical activity and physical fitness may favorably affect risk factors for cardiovascular disease (e.g., body mass index, blood lipid profiles, and resting blood pressure) (*87–100*). Regular physical activity among children and adolescents with chronic disease risk factors is important (*101–105*): it decreases blood pressure in adolescents with borderline hypertension (*81*), increases physical fitness in obese children (*106,107*), and decreases the degree of overweight among obese children (*108–111*). Physical activity among adolescents is consistently related to higher levels of self-esteem and self-concept and lower levels of anxiety and stress (*112*). Although the relationship between physical activity during youth and the development of osteoporosis later in life is unclear (*113*), evidence exists that weight-bearing exercise increases bone mass density among young people (*114,115*).

RECOMMENDED PHYSICAL ACTIVITY FOR YOUNG PEOPLE

Increased awareness of the health benefits of physical activity has led to increased recognition of the need for initiatives to reduce sedentary lifestyles (*1–3,5–8,116–127*). The International Consensus Conference on Physical Activity Guidelines for Adolescents recommends that "all adolescents...be physically active daily, or nearly every day, as part of play, games, sports, work, transportation, recreation, physical education, or planned exercise, in the context of family, school, and community activities" and that "adolescents engage in three or more sessions per week of activities that last 20 minutes or more at a time and that require moderate to vigorous levels of exertion" (*128*).

PREVALENCE OF PHYSICAL ACTIVITY AMONG YOUNG PEOPLE

Although children and adolescents are more physically active than adults, many young people do not engage in moderate or vigorous physical activity at least 3 days a week (*47,48,129–131*). For example, among high school students, only 52% of girls and 74% of boys reported that they exercised vigorously on at least 3 of the previous

7 days (*48*). Physical activity among both girls and boys tends to decline steadily during adolescence. For example, 69% of young people 12–13 years of age but only 38% of those 18–21 years of age exercised vigorously on at least 3 of the preceding 7 days (*47*), and 72% of 9th-grade students but only 55% of 12th-grade students engaged in this level of physical activity (*48*).

FACTORS INFLUENCING PHYSICAL ACTIVITY

Demographic, individual, interpersonal, and environmental factors are associated with physical activity among children and adolescents. Demographic factors include sex, age, and race or ethnicity. Girls are less active than boys, older children and adolescents are less active than younger children and adolescents, and among girls, blacks are less active than whites (*47,48,132–134*).

Individual factors positively associated with physical activity among young people include confidence in one's ability to engage in exercise (i.e., self-efficacy) (*133,135,136*), perceptions of physical or sport competence (*137–141*), having positive attitudes toward physical education (*133,138*), and enjoying physical activity (*142,143*). Perceiving benefits from engaging in physical activity or being involved in sports is positively associated with increased physical activity among young people (*133,137,138*). These perceived benefits include excitement and having fun; learning and improving skills; staying in shape; improving appearance; and increasing strength, endurance, and flexibility (*132,137,144–147*). Conversely, perceiving barriers to physical activity, particularly lack of time, is negatively associated with physical activity among adolescents (*133,137,148*). In addition, a person's stage of change (i.e., readiness to begin being physically active) (*149–153*) influences physical activity among adults and may also influence physical activity among young people.

Interpersonal and environmental factors positively associated with physical activity among young people include peers' or friends' support for and participation in physical activity (*133,142,154*). Among older children and adolescents, physical activity is positively associated with that of siblings (*155,156*), and research generally reveals a positive relationship between the physical activity level of parents and that of their children, particularly adolescents (*133,135,141,142,154,156–163*). Parental support for physical activity is correlated with active lifestyles among adolescents (*133,141,154,157*). Physical activity among young people is also positively correlated with having access to convenient play spaces (*133,160*), sports equipment (*142,157*), and transportation to sports or fitness programs (*158*).

OBJECTIVES FOR PHYSICAL ACTIVITY AMONG YOUNG PEOPLE

The following national health promotion and disease prevention objectives for the year 2000 are related to physical activity and fitness among children and adolescents (*164*).

1.2 Reduce overweight to a prevalence of ≤20% among people aged ≥20 years and ≤15% among adolescents aged 12–19 years.

1.3 Increase to ≥30% the proportion of people aged ≥6 years who engage regularly, preferably daily, in light to moderate physical activity for ≥30 minutes per day.

1.4 Increase to ≥20% the proportion of people aged ≥18 years and to ≥75% the proportion of children and adolescents aged 6–17 years who engage in vigorous physical activity that promotes the development and maintenance of cardiorespiratory fitness ≥3 days per week for ≥20 minutes per occasion.

1.5 Reduce to ≤15% the proportion of people aged ≥6 years who engage in no leisure-time physical activity.

1.6 Increase to ≥40% the proportion of people aged ≥6 years who regularly perform physical activities that enhance and maintain muscular strength, muscular endurance, and flexibility.

1.7 Increase to ≥50% the proportion of overweight people aged ≥12 years who have adopted sound dietary practices combined with regular physical activity to attain an appropriate body weight.

1.8 Increase to ≥50% the proportion of children and adolescents in 1st through 12th grade who participate in daily school physical education.

1.9 Increase to ≥50% the proportion of school physical education class time that students spend being physically active, preferably engaged in lifetime physical activities.

1.11 Increase community availability and accessibility of physical activity and fitness facilities.

1.12 Increase to ≥50% the proportion of primary care providers who routinely assess and counsel their patients regarding the frequency, duration, type, and intensity of each patient's physical activity practices.

RATIONALE FOR SCHOOL AND COMMUNITY EFFORTS TO PROMOTE PHYSICAL ACTIVITY AMONG YOUNG PEOPLE

Schools and communities should promote physical activity among children and adolescents because many young people already have risk factors for chronic diseases associated with adult morbidity and mortality (*165*). For example, the prevalence of overweight is at an all-time high among children and adolescents (*166*). In addition, physical activity has a beneficial effect on the physical and mental health of young people (*81–100,106–112,114,115*).

People begin to acquire and establish patterns of health-related behaviors during childhood and adolescence (*167*); thus, young people should be encouraged to engage in physical activity. However, many children are less physically active than recommended (*47,48,129–131*). Physical activity declines during adolescence (*47,48*), and enrollment in daily physical education has decreased (*48,168*).

Schools and communities have the potential to improve the health of young people by providing instruction, programs, and services that promote enjoyable, lifelong physical activity (*116–121,124,125*). Schools are an efficient vehicle for providing physical activity instruction and programs because they reach most children and adolescents (*49,125,169*). Communities are essential because most physical activity among young people occurs outside the school setting (*129,170*).

Schools and communities should coordinate their efforts to make the best use of their resources in promoting physical activity among young people (*49,50*). School personnel, students, families, community organizations, and businesses should collaborate to develop, implement, and evaluate physical activity instruction and programs for young people. One way to achieve this collaboration is to form a coalition (*171*). National, state, and local resources that might be useful in promoting physical activity among young people are available to schools and community groups (Appendix A).

Within the school, efforts to promote physical activity among students should be part of a coordinated, comprehensive school health program, which is "an integrated set of planned, sequential, and school-affiliated strategies, activities, and services designed to promote the optimal physical, emotional, social, and educational development of students. The program involves and is supportive of families and is determined by the local community based on community needs, resources, standards, and requirements. It is coordinated by a multidisciplinary team and accountable to the community for program quality and effectiveness" (*172*). This coordinated program should include health education; physical education; health services; school counseling and social services; nutrition services; the psychosocial and biophysical environment; faculty and staff health promotion; and integrated efforts of schools, families, and communities (*173*). These programs have the potential to improve both the health and the educational prospects of students (*49,50*).

Some school health programs have implemented educational and environmental interventions to promote physical activity among students (*132,174–187*). These programs have been effective in enhancing students' physical activity-related knowledge (*174,175,183*), attitudes (*187*), and behavior (*132,186*) and their physical fitness (*183*). Programs that seem to be most effective focus on social factors that influence physical activity (e.g., peers' support for physical activity (*188*).

RECOMMENDATIONS FOR SCHOOL AND COMMUNITY PROGRAMS PROMOTING PHYSICAL ACTIVITY AMONG YOUNG PEOPLE

Listed below are 10 broad recommendations for school and community programs to promote physical activity among young people. Following this list, each recommendation is described in detail.

1. **Policy:** Establish policies that promote enjoyable, lifelong physical activity among young people.
2. **Environment:** Provide physical and social environments that encourage and enable safe and enjoyable physical activity.
3. **Physical education:** Implement physical education curricula and instruction that emphasize enjoyable participation in physical activity and that help students develop the knowledge, attitudes, motor skills, behavioral skills, and confidence needed to adopt and maintain physically active lifestyles.
4. **Health education:** Implement health education curricula and instruction that help students develop the knowledge, attitudes, behavioral skills, and confidence needed to adopt and maintain physically active lifestyles.

5. Extracurricular activities: Provide extracurricular physical activity programs that meet the needs and interests of all students.

6. Parental involvement: Include parents and guardians in physical activity instruction and in extracurricular and community physical activity programs, and encourage them to support their children's participation in enjoyable physical activities.

7. Personnel training: Provide training for education, coaching, recreation, health-care, and other school and community personnel that imparts the knowledge and skills needed to effectively promote enjoyable, lifelong physical activity among young people.

8. Health services: Assess physical activity patterns among young people, counsel them about physical activity, refer them to appropriate programs, and advocate for physical activity instruction and programs for young people.

9. Community programs: Provide a range of developmentally appropriate community sports and recreation programs that are attractive to all young people.

10. Evaluation: Regularly evaluate school and community physical activity instruction, programs, and facilities.

Recommendation 1. Policy: Establish policies that promote enjoyable, lifelong physical activity among young people.

Policies provide formal and informal rules that guide schools and communities in planning, implementing, and evaluating physical activity programs for young people. School and community policies related to physical activity should comply with state and local laws and with recommendations and standards provided by national, state, and local agencies and organizations. These policies should be included in a written document that incorporates input from administrators, teachers, coaches, athletic trainers, parents, students, health-care providers, public health professionals, and other school and community personnel and should address the following requirements.

Require comprehensive, daily physical education for students in kindergarten through grade 12.

Physical education instruction can increase students' knowledge (*183*), physical activity in physical education class (*177,179,189*), and physical fitness (*183,190–195*). Daily physical education from kindergarten through 12th grade is recommended by the American Heart Association (*118*) and the National Association for Sport and Physical Education (*196*) and is also a national health objective for the year 2000 (*164*). The minimum amount of physical education required for students is usually set by state law. Although most states (94%) and school districts (95%) require some physical education (*173,197*), only one state requires it daily from kindergarten through 12th grade. Less than two thirds (60%) of high school students are enrolled in physical education classes, and only 25% take physical education daily (*48*). Enrollment in both physical education (9th grade, 81%; 12th grade, 42%) and daily physical education (9th grade, 41%; 12th grade, 13%) declines at higher grades, and enrollment in daily physical education and active time in physical education classes decreased from 1991 to 1995 among high school students (*48*). Further, 30% of schools exempt students from physical education if the students participate in band,

chorus, cheerleading, or interscholastic sports (*197*). Substitution of these programs for physical education reduces students' opportunities to develop knowledge, attitudes, motor skills, behavioral skills, and confidence related to physical activity (*196,198*).

Require comprehensive health education for students in kindergarten through grade 12.

Comprehensive health education, which includes instruction on physical activity topics, can complement the instruction students receive in comprehensive physical education (*179*). Health education may improve students' health knowledge, attitudes, and behaviors (*199*). Many educational organizations recommend that students receive planned and sequential health education from kindergarten through 12th grade (*200–203*), and such education is a national health objective for the year 2000 (*164*). Although many states (90%) and school districts (91%) require that schools offer health education, fewer school districts require that a separate course be devoted to health topics (elementary school, 19%; middle school, 44%; senior high school, 66%) (*204*). Administrators of public schools and parents of adolescents in public schools believe that these students should be taught more health information and skills (*205*).

Require that adequate resources, including budget and facilities, be committed for physical activity instruction and programs.

The National Association for Sport and Physical Education and the Joint Committee for National Health Education Standards note that adequate budget and facilities are necessary for physical education, health education, extracurricular physical activities, and community sports and recreation programs to be successful (*198,206–208*). However, these programs rarely have sufficient resources (*168,209*). Schools and communities should be vigilant in ensuring that physical education, health education, and physical activity programs have sufficient financial and facility resources to ensure safe participation by young people (*198,206–208*). Schools should have policies that ensure that teacher-to-student ratios in physical education are comparable to those in other subjects (*198,206,207,210*) and that physical education spaces and facilities are not usurped for other events. Schools should have policies requiring that physical education classes be scheduled so that students in each class are of similar physical maturity and grade level (*198,206,207*).

Require the hiring of physical education specialists to teach physical education in kindergarten through grade 12, elementary school teachers trained to teach health education, health education specialists to teach health education in middle and senior high schools, and qualified people to direct school and community physical activity programs and to coach young people in sports and recreation programs.

Planning, implementing, and evaluating physical activity instruction and programs require specially trained personnel (*125,198,206–208,211*). Physical education specialists teach longer lessons, spend more time on developing skills, impart more knowledge, and provide more moderate and vigorous physical activity than do classroom teachers (*189,212*). Schools should have policies requiring that physical

education specialists teach physical education in kindergarten through grade 12, elementary school teachers trained to teach health education do so in elementary schools, health education specialists teach health education in middle and senior high schools, and qualified people direct school and community physical activity programs and coach young people in sports and recreation programs (*198,206–208,211*).

Some states have established minimum standards for teachers. Eighty-four percent of states require physical education certification for secondary school physical education teachers, and 16% require such certification for elementary school physical education teachers (*197*). Only 69% of states require health education certification for secondary school health education teachers (*204*). These data indicate the need for a greater commitment to hiring professionally trained physical education specialists and health education specialists for our nation's schools.

Some states have established minimum standards for athletic coaches. Both schools and communities should have policies that require employing people who have the coaching competency appropriate to participants' developmental and skill levels (*213*). Coaches who work with beginning athletes should meet at least the Level I, if not Level II, coaching competencies identified by the National Association for Sport and Physical Education (*213*). Entry-level interscholastic coaches and master coaches should achieve at least Level III and Level IV coaching competencies, respectively (*213*).

Require that physical activity instruction and programs meet the needs and interests of all students.

All students, irrespective of their sex, race/ethnicity, health status, or physical and cognitive ability or disability should have access to physical education, health education, extracurricular physical activity programs, and community sports and recreation programs that meet their needs and interests (*214,215*). In addition, physical activity programs that overemphasize a limited set of team sports and underemphasize noncompetitive, lifetime fitness and recreational activities (e.g., walking or bicycling) could exclude or be unattractive to potential participants (*131,216*).

Adolescents' interests and participation in physical activity differ by sex (*47, 48,217*). For example, compared with boys, girls engage in less physical activity (*47,48*), are less likely to participate in team sports (*47,48,218*), and are more likely to participate in aerobics or dance (*47*). Girls and boys also perceive different benefits of physical activity (*132,137,145,147*); for example, boys more often cite competition and girls more often cite weight management as a reason for engaging in physical activity (*132,137*). Because boys are more likely than girls to have higher perceptions of self-efficacy (*136*) and physical competence (*137,219*), physical activity programs serving girls should provide instruction and experiences that increase girls' confidence in participating in physical activity, opportunities for them to participate in physical activities, and social environments that support their involvement in a range of physical activities. Adolescents' participation in physical activity also differs by race and ethnicity (*47,48*).

Children and adolescents who are obese or who have physical or cognitive disabilities, chronic health conditions (e.g., diabetes, heart disease, or asthma), or low levels of fitness need instruction and programs in which they can develop motor skills, improve fitness, and experience enjoyment and success (*3,124,143,164,220*). Young

people who have these disabilities or health concerns are often overtly or unintentionally discouraged from engaging in regular physical activity even though they may be in particular need of it (*220,221*). For example, 59% of high schools allow students who have physical disabilities to be exempt from physical education courses (*197*). Schools should be required to provide modified physical education and health education for these students (*221,222*). By modifying physical education, health education, extracurricular physical activities, and community sports and recreation programs, schools and communities can help these young people acquire the physical, mental, and social benefits of physical activity.

Physical education, health education, extracurricular physical activity programs, and community sports and recreation programs can also provide opportunities for multicultural experiences (e.g., American Indian and African dance). These experiences can meet children's and adolescents' interests and foster their awareness and appreciation of different physical activities enjoyed by different cultural groups (*223*).

Recommendation 2. Environment: Provide physical and social environments that encourage and enable safe and enjoyable physical activity.

The physical and social environments of children and adolescents should encourage and enable their participation in safe and enjoyable physical activities. These environments are described by the following guidelines.

Provide access to safe spaces and facilities for physical activity in the school and the community.

School spaces and facilities should be available to young people before, during, and after the school day, on weekends, and during summer and other vacations. These spaces and facilities should also be readily available to community agencies and organizations offering physical activity programs (*3,118,119,124,127,198,200, 206,207,224*).

National health objective 1.11 calls for increased availability of facilities for physical activity (e.g., hiking, bicycling, and fitness trails; public swimming pools; and parks and open spaces for recreation) (*164*). Community coalitions should coordinate the availability of these open spaces and facilities. Some communities may need to build new facilities, whereas others may need only to coordinate existing community spaces and facilities. The needs of all children and adolescents, particularly those who have disabilities, should be incorporated into the building of new facilities and the coordination of existing ones.

Schools and communities should ensure that spaces and facilities meet or exceed recommended safety standards for design, installation, and maintenance (*206,207, 225,226*). For example, playgrounds should have cool water and adequate shade for play and rest (*227*). Young people also need places that are free from violence and free from exposure to environmental hazards (e.g., fumes from incinerators or motor vehicles). Spaces and facilities for physical activity should be regularly inspected, and hazardous conditions should be immediately corrected (*206,207,228*).

Establish and enforce measures to prevent physical activity-related injuries and illnesses.

Minimizing physical activity-related injuries and illnesses among young people is the joint responsibility of teachers, administrators, coaches, athletic trainers, other school and community personnel, parents, and young people (*226*). Preventing injuries and illness includes having appropriate adult supervision, ensuring compliance with safety rules and the use of protective clothing and equipment, and avoiding the effects of extreme weather conditions. Explicit safety rules should be taught to, and followed by, young people in physical education, health education, extracurricular physical activity programs, and community sports and recreation programs (*164,206, 229–231*). Adult supervisors should consistently reinforce safety rules (*231*).

Adult supervisors should be aware of the potential for physical activity-related injuries and illnesses among young people so that the risks for and consequences of these injuries and illnesses can be minimized (*228,229*). These adults should receive medical information relevant to each student's participation in physical activity (e.g., whether the child has asthma), be able to provide first aid and cardiopulmonary resuscitation, and practice precautions to prevent the spread of bloodborne pathogens (e.g., the human immunodeficiency virus) (*198,207*). Written policies on providing first aid and reporting injuries and illnesses to parents and to appropriate school and community authorities should be established and followed (*198,207*). Adult supervisors can take the following steps to avoid injuries and illnesses during structured physical activity for young people: require physical assessment before participation, provide developmentally appropriate activities, ensure proper conditioning, provide instruction on the biomechanics of specific motor skills, appropriately match participants according to size and ability, adapt rules to the skill level of young people and the protective equipment available, avoid excesses in training, modify rules to eliminate unsafe practices, and ensure that injuries are healed before further participation (*198,207,227,228*).

Children and adolescents should be provided with, and required to use, protective clothing and equipment appropriate to the type of physical activity and the environment (*164,198,206,207,227–229,231*). Protective clothing and equipment includes footwear appropriate for the specific activity; helmets for bicycling; helmets, face masks, mouth guards, and protective pads for football and ice hockey; and reflective clothing for walking and running. Protective gear and athletic equipment should be frequently inspected, and they should be replaced if worn, damaged, or outdated.

Exposure to the sun can be minimized by use of protective hats, clothing, and sunscreen; avoidance of midday sun exposure; and use of shaded spaces or indoor facilities (*164,227,232*). Heat-related illnesses can be prevented by ensuring that children and adolescents frequently drink cool water, have adequate rest and shade, play during cool times of the day, and are supervised by people trained to recognize the early signs of heat exhaustion and heat stroke (*227*). Cold-related injuries can be avoided by ensuring that young people wear multilayered clothing for outside play and exercise, increasing the intensity of outdoor activities, using indoor facilities during extremely cold weather, ensuring proper water temperature for aquatic activities, and providing supervision by persons trained to recognize the early signs of frostbite and hypothermia (*227*). Measures should be taken to avoid health problems

associated with poor air quality (e.g., reduce the intensity of physical activity or hold physical education classes or programs indoors).

Teachers, parents, coaches, athletic trainers, and health-care providers should promote a range of healthy behaviors. These adults should encourage young people to abstain from tobacco, alcohol, and other drugs; to maintain a healthy diet; and to practice healthy weight management techniques (*227*). Adult supervisors should be aware of the signs and symptoms of eating disorders and take steps to prevent eating disorders among young people (*227*).

Provide time within the school day for unstructured physical activity.

During the school day, opportunities for physical activity exist within physical education classes, during recess, and immediately before and after school. For example, students in grades one through four have an average recess period of 30 minutes (*233*). School personnel should encourage students to be physically active during these times. The use of time during the school day for unstructured physical activity should complement rather than substitute for the physical activity and instruction children receive in physical education classes.

Discourage the use or withholding of physical activity as punishment.

Teachers, coaches, and other school and community personnel should not force participation in or withhold opportunities for physical activity as punishment. Using physical activity as a punishment risks creating negative associations with physical activity in the minds of young people. Withholding physical activity deprives students of health benefits important to their well-being.

Provide health promotion programs for school faculty and staff.

Enabling school personnel to participate in physical activity and other healthy behaviors should help them serve as role models for students. School-based health promotion programs have been effective in improving teachers' participation in vigorous exercise, which in turn has improved their physical fitness, body composition, blood pressure, general well-being, and ability to handle job stress (*234,235*). In addition, participants in school-based health promotion programs may be less likely than nonparticipants to be absent from work (*235*).

Recommendation 3. Physical education: Implement physical education curricula and instruction that emphasize enjoyable participation in physical activity and that help students develop the knowledge, attitudes, motor skills, behavioral skills, and confidence needed to adopt and maintain physically active lifestyles.

Physical education curricula and instruction are vital parts of a comprehensive school health program. One of the main goals of these curricula should be to help students develop an active lifestyle that will persist into and throughout adulthood (*3,174,180,236,237*).

Provide planned and sequential physical education curricula from kindergarten through grade 12 that promote enjoyable, lifelong physical activity.

School physical education curricula are often mandated by state laws or regulations. Many states (76%) and school districts (89%) have written goals, objectives, or outcomes for physical education (CDC, unpublished data), and only 26% of states require a senior high school physical education course promoting physical activities that can be enjoyed throughout life (*197*). Planned and sequential physical education curricula should emphasize knowledge about the benefits of physical activity and the recommended amounts and types of physical activity needed to promote health (*3,116–118,124,164*). Physical education should help students develop the attitudes, motor skills, behavioral skills, and confidence they need to engage in lifelong physical activity (*116–118,122,125, 164,237*). Physical education should emphasize skills for lifetime physical activities (e.g., dance, strength training, jogging, swimming, bicycling, cross-country skiing, walking, and hiking) rather than those for competitive sports (*116–118,164,197, 237–239*).

If physical fitness testing is used, it should be integrated into the curriculum and emphasize health-related components of physical fitness (e.g., cardiorespiratory endurance, muscular strength and endurance, flexibility, and body composition). The tests should be administered only after students are well oriented to the testing procedures. Testing should be a mechanism for teaching students how to apply behavioral skills (e.g., self-assessment, goal setting, and self-monitoring) to physical fitness development and for providing feedback to students and parents about students' physical fitness. The results of physical fitness testing should not be used to assign report card grades (*193,240,241*). Also, test results should not be used to assess program effectiveness; the validity of these measurements may be unreliable, and physical fitness and improvements in physical fitness are influenced by factors (e.g., physical maturation, body size, and body composition) beyond the control of teachers and students (*193,240,241*).

Use physical education curricula consistent with the national standards for physical education.

The national standards for physical education (*211*) describe what students should know and be able to do as a result of physical education. A student educated about physical activity "has learned skills necessary to perform a variety of physical activities, is physically fit, does participate regularly in physical activity, knows the implications of and the benefits from involvement in physical activities, [and] values physical activity and its contribution to a healthful lifestyle" (*196*). The national standards emphasize the development of movement competency and proficiency, use of cognitive information to enhance motor skill acquisition and performance, establishment of regular participation in physical activity, achievement of health-enhancing physical fitness, development of responsible personal and social behavior, understanding of and respect for individual differences, and awareness of values and benefits of physical activity participation (*211*). These standards provide a framework that should be used to design, implement, and evaluate physical education curricula that promote enjoyable, lifelong physical activity.

Use active learning strategies and emphasize enjoyable participation in physical education class.

Enjoyable physical education experiences are believed to be essential in promoting physical activity among children and adolescents (*3,124,125*). Physical education experiences that are enjoyable and actively involve students in learning may help foster positive attitudes toward and encourage participation in physical education and physical activity (*133,138*). Active learning strategies that involve the student in learning physical activity concepts, motor skills, and behavioral skills include brainstorming, cooperative groups, simulation, and situation analysis.

Develop students' knowledge of and positive attitudes toward physical activity.

Knowledge of physical activity is viewed as an essential component of physical education curricula (*117,118,124,125,164*). Related concepts include the physical, social, and mental health benefits of physical activity; the components of health-related fitness; principles of exercise; injury prevention; precautions for preventing the spread of bloodborne pathogens; nutrition and weight management; social influences on physical activity; and the development of safe and effective individualized physical activity programs. For both young people and adults, knowledge about how to be physically active may be a more important influence on physical activity than is knowledge about why to be active (*237,242*).

Positive attitudes toward physical activity may affect young people's involvement in physical activity (*116–118,124,125,164*). Positive attitudes include perceptions that physical activity is important and that it is fun. Ways to generate positive attitudes include providing students with enjoyable physical education experiences that meet their needs and interests, emphasizing the many benefits of physical activity, supporting students who are physically active, and using active learning strategies.

Develop students' mastery of and confidence in motor and behavioral skills for participating in physical activity.

Physical education should help students master (*243–245*) and gain confidence in (*3,125,219,242*) motor and behavioral skills used in physical activity. Students should become competent in many motor skills and proficient in a few to use in lifelong physical activities (*117,118,122,124,164,211*). Elementary school students should develop basic motor skills that allow participation in a variety of physical activities, and older students should become competent in a select number of lifetime physical activities they enjoy and succeed in. Students' mastery of and confidence in motor skills occurs when these skills are broken down into components and the tasks are ordered from easy to hard (*246*). In addition, students need opportunities to observe others performing the skills and to receive encouragement, feedback, and repeated opportunities for practice during physical education class (*246*).

Behavioral skills (e.g., self-assessment, self-monitoring, decision making, goal setting, and communication) may help students establish and maintain regular involvement in physical activity. Active student involvement and social learning experiences that focus on building confidence may increase the likelihood that children

and adolescents will enjoy and succeed in physical education and physical activity (*246*).

Provide a substantial percentage of each student's recommended weekly amount of physical activity in physical education classes.

For physical education to make a meaningful and consistent contribution to the recommended amount of young people's physical activity, students at every grade level should take physical education classes that meet daily and should be physically active for a large percentage of class time (*3,125,164,247*). National health objective 1.9 calls for students to be physically active for at least 50% of physical education class time (*164*), but many schools do not meet this objective (*212,248–251*), and the percentage of time students spend in moderate or vigorous physical activity during physical education classes has decreased over the past few years (*48*).

Promote participation in enjoyable physical activity in the school, community, and home.

Physical education teachers should encourage students to be active before, during, and after the school day. Physical education teachers can also refer students to community physical sports and recreation programs available in their community (*3*) and promote participation in physical activity at home by assigning homework that students can do on their own or with family members (*122*).

Recommendation 4. Health education: Implement health education curricula and instruction that help students develop the knowledge, attitudes, behavioral skills, and confidence needed to adopt and maintain physically active lifestyles.

Health education can effectively promote students' health-related knowledge, attitudes, and behaviors (*199,252,253*). The major contribution of health education in promoting physical activity among students should be to help them develop the knowledge, attitudes, and behavioral skills they need to establish and maintain a physically active lifestyle (*208,209,254*).

Provide planned and sequential health education curricula from kindergarten through grade 12 that promote lifelong participation in physical activity.

Many states (65%) and school districts (82%) require that physical activity and physical fitness topics be part of a required course in health education (*204*). Planned and sequential health education curricula, like physical education curricula, should draw on social cognitive theory (*188*) and emphasize physical activity as a component of a healthy lifestyle.

Use health education curricula consistent with the national standards for health education.

The national standards for health education developed by the Joint Committee for National Health Education Standards (*208*) describe what health-literate students

should know and be able to do as a result of school health education. Health literacy is "the capacity of individuals to obtain, interpret, and understand basic health information and services and the competence to use such information and services in ways which enhance health" (*208*). The standards specify that, as a result of health education, students should be able to comprehend basic health concepts; access valid health information and health-promoting products and services; practice health-enhancing behaviors; analyze the influence of culture and other factors on health; use interpersonal communication skills to enhance health; use goal-setting and decision-making skills to enhance health; and advocate for personal, family, and community health. These standards emphasize the development of students' skills and can be used as the basis for health education curricula.

Promote collaboration among physical education, health education, and classroom teachers as well as teachers in related disciplines who plan and implement physical activity instruction.

Physical education and health education teachers in about one third of middle and senior high schools collaborate on activities or projects (*197,204*). Collaboration allows coordinated physical activity instruction and should enable teachers to provide range and depth of physical activity-related content and skills. For example, health education and physical education teachers can collaborate to reinforce the link between sound dietary practices and regular physical activity for weight management. Collaboration also allows teachers to highlight the influence of other behaviors on the capacity to engage in physical activity (e.g., using alcohol or other drugs) or behaviors that interact with physical activity to reduce the risk of developing chronic diseases (e.g., not using tobacco).

Use active learning strategies to emphasize enjoyable participation in physical activity in the school, community, and home.

Health education instruction should include the use of active learning strategies. Such strategies may encourage students' active involvement in learning and help them develop the concepts, attitudes, and behavioral skills they need to engage in physical activity (*209,254*). Additionally, health education teachers should encourage students to adopt healthy behaviors (e.g., physical activity) in the school, community, and home.

Develop students' knowledge of and positive attitudes toward healthy behaviors, particularly physical activity.

Health education curricula should provide information about physical activity concepts (*3*). These concepts should include the physical, social, and mental health benefits of physical activity; the components of health-related fitness; principles of exercise; injury prevention and first aid; precautions for preventing the spread of bloodborne pathogens; nutrition, physical activity, and weight management; social influences on physical activity; and the development of safe and effective individualized physical activity programs.

Health instruction should also generate positive attitudes toward healthy behaviors. These positive attitudes include perceptions that it is important and fun to participate in physical activity. Ways to foster positive attitudes include emphasizing

the multiple benefits of physical activity, supporting children and adolescents who are physically active, and using active learning strategies.

Develop students' mastery of and confidence in the behavioral skills needed to adopt and maintain a healthy lifestyle that includes regular physical activity.

Children and adolescents should develop behavioral skills that may enable them to adopt healthy behaviors (*116,164*). Certain skills (e.g., self-assessment, self-monitoring, decision making, goal setting, identifying and managing barriers, self-regulation, reinforcement, communication, and advocacy) may help students adopt and maintain a healthy lifestyle that includes regular physical activity. Active learning strategies give students opportunities to practice, master, and develop confidence in these skills (*209,254*).

Recommendation 5. Extracurricular activities: Provide extracurricular physical activity programs that meet the needs and interests of all students.

Extracurricular activities are any activities offered by schools outside of formal classes. Interscholastic athletics, intramural sports, and sports and recreation clubs are believed to contribute to the physical and social development of young people (*196*), and schools should extend these benefits to the greatest possible number of students. These activities can help meet the goals of comprehensive school health programs by providing students with opportunities to engage in physical activity and to further develop the knowledge, attitudes, motor skills, behavioral skills, and confidence needed to adopt and maintain physically active lifestyles.

Provide a diversity of developmentally appropriate competitive and noncompetitive physical activity programs for all students.

Interscholastic athletic programs are typically limited to the secondary school level and usually consist of a few highly competitive team sports. Intramural sports programs are not common but, where they are offered, usually emphasize competitive team sports. Such programs usually underserve students who are less skilled, less physically fit, or not attracted to competitive sports (*145,255,256*). One reason that participation in sports declines steadily during late childhood and adolescence is that undue emphasis is placed on competition (*145*).

After the needs and interests of all students are assessed, interscholastic, intramural, and club programs should be modified and expanded to offer a range of competitive and noncompetitive activities. For example, noncompetitive lifetime physical activities include walking, running, swimming, and bicycling (*118*).

Link students to community physical activity programs, and use community resources to support extracurricular physical activity programs.

Schools should work with community organizations to enhance the appropriate use of out-of-school time among children and adolescents (*224*) and to develop effective systems for referring young people from schools to community agencies and organizations that can provide needed services. To help students learn about

community resources, schools can sponsor information fairs that represent community groups, physical education and health education teachers can provide information about community resources as part of the curricula (*3*), and community-based program personnel can be speakers or demonstration lecturers in school classes.

Frequently schools have the facilities but lack the personnel to deliver extracurricular physical activity programs. Community resources can expand existing school programs by providing intramural and club activities on school grounds. For example, community agencies and organizations can use school facilities for after-school physical fitness programs for children and adolescents, weight management programs for overweight or obese young people, and sports and recreation programs for young people with disabilities or chronic health conditions.

Recommendation 6. Parental involvement: Include parents and guardians in physical activity instruction and in extracurricular and community physical activity programs, and encourage them to support their children's participation in enjoyable physical activities.

Parental involvement in children's physical activity instruction and programs is key to the development of a psychosocial environment that promotes physical activity among young people (*116,117,208,231,257,258*). Involvement in these programs provides parents opportunities to be partners in developing their children's physical activity-related knowledge, attitudes, motor skills, behavioral skills, confidence, and behavior. Thus, teachers, coaches, and other school and community personnel should encourage and enable parental involvement. For example, teachers can assign homework to students that must be done with their parents and can provide flyers designed for parents that contain information and strategies for promoting physical activity within the family (*259*). Parents can also join school health advisory councils, booster clubs, and parent-teacher organizations (*209,259*). Parents who have been trained by professionals can also serve as volunteer coaches for or leaders of extracurricular physical activity programs and community sports and recreation programs.

Encourage parents to advocate for quality physical activity instruction and programs for their children.

Parents may be able to influence the quality and quantity of physical activity available to their children by advocating for comprehensive, daily physical education in schools and for school and community physical activity programs that promote lifelong physical activity among young people (*164*). Parents should also advocate for safe spaces and facilities that provide their children opportunities to engage in a range of physical activities (*164,257*).

Encourage parents to support their children's participation in appropriate, enjoyable physical activities.

Parents should ensure that their children participate in physical education classes, extracurricular physical activity programs, and community sports and recreation programs in which the children will experience enjoyment and success (*145*). Parents

should learn what their children want from extracurricular and community physical activity programs and then help select appropriate activities (*145*). Fun and skill development, rather than winning, are the primary reasons most young people participate in physical activity and sports programs (*145,255*). Parents should help their children gain access to toys and equipment for physical activity and transportation to activity sites (*145*).

Encourage parents to be physically active role models and to plan and participate in family activities that include physical activity.

Parental support is a determinant of physical activity among children and adolescents (*133,141,154,157*), and parents' attitudes toward physical activity may influence children's involvement in physical activity (*260*). Parents and guardians should try to be role models for physical activity behavior and should plan and participate in family activities (e.g., going to the community swimming pool or using the community trails for bicycling or walking) (*3,116,117,164,231,239,257,258*).

Because peers and friends influence children's physical activity behavior (*133, 142,154*), parents can encourage their children to be active with their friends. Children's participation in sedentary activities (e.g., watching television or playing video games) should be monitored and replaced with physical activity (*164,242*), and parents should encourage their children to play outside in safe places and in supervised playgrounds and parks (*231,261*).

Recommendation 7. Personnel training: Provide training for education, coaching, recreation, health-care, and other school and community personnel that imparts the knowledge and skills needed to effectively promote enjoyable, lifelong physical activity among young people.

The lack of trained personnel is a barrier to implementing safe, organized, and effective physical activity instruction and programs for young people. National, state, and local education and health agencies; institutions of higher education; and national and state professional organizations should collaborate to provide teachers, coaches, administrators, and other school personnel pre-service and in-service training in promoting enjoyable, lifelong physical activity among young people (*116,121, 124,164,247,262*). Instructor training has proven to be efficacious; for example, physical education specialists teach longer and higher quality lessons (*189,212*), and teacher training is important in successful implementation of innovative health education curricula (*263,264*). Institutions of higher education should use national guidelines such as those for athletic coaches (*213*), entry-level physical education teachers (*265*), entry-level health education teachers (*266*), and elementary school classroom teachers (*267*) to plan, implement, and evaluate professional preparation programs for school personnel. In addition, physicians, school nurses, and others who provide health services to young people need pre-service training in promoting physical activity and providing physical activity assessment, counseling, and referral (*116, 121,124,164*).

Although many states and school districts provide in-service training on physical education topics (72% and 50%, respectively) (*197*), all states and school districts need to do so. School personnel often want more training than they receive. For example, more than one third of lead physical education teachers want additional training in developing individualized fitness programs, increasing students' physical activity inside and outside of class, and involving families in physical activity (*197*).

Train teachers to deliver physical education that provides a substantial percentage of each student's recommended weekly amount of physical activity.

The proportion of physical education class time spent on moderate or vigorous physical activity is insufficient to meet national health objective 1.9 (*212,248-251*). In-service teacher training that focuses on increasing the amount of class time spent on moderate or vigorous physical activity is effective in increasing students' physical activity during physical education classes (*176,177,179,189*). Although 52% of states have offered training to physical education teachers on increasing students' physical activity during class, only 15% of school districts have provided this training (*197*). National, state, and local education and health agencies; institutions of higher education; and national and state professional organizations should augment efforts to provide this training to teachers.

Train teachers to use active learning strategies needed to develop students' knowledge about, attitudes toward, skills in, and confidence in engaging in physical activity.

Physical education and health education teachers should observe experienced teachers using active learning strategies, have hands-on practice in using these strategies, and receive feedback (*268*). Such training should increase teachers' use of these strategies.

Train school and community personnel how to create psychosocial environments that enable young people to enjoy physical activity instruction and programs.

Pre-service and in-service training should help teachers, coaches, and other school and community personnel plan and implement physical education as well as extracurricular and community physical activity programs that meet a range of students' needs and interests. Training should also encourage these school and community personnel to place less emphasis on competition and more emphasis on students' having fun and developing skills.

Train school and community personnel how to involve parents and the community in physical activity instruction and programs.

Few teachers, coaches, and other school personnel have been trained to involve families and the community in physical activity instruction and programs (*197*). Instruction on communication skills for interacting with parents and the community as well as strategies for obtaining adults' support for physical activity instruction and programs is beneficial (*124,259*). Teachers should have the knowledge, skills, and

materials for creating fact sheets for parents and assigning physical education and health education homework for students to complete with their families (*259*).

Train volunteers who coach sports and recreation programs for young people.

Volunteer coaches who work with beginning athletes in schools and communities should have the Level I coaching competency delineated by the National Association for Sport and Physical Education (*213*). Like professional coaches, volunteer coaches should receive professional training on how to provide experiences for young people that emphasize fun, skill development, confidence-building, and self-knowledge (*145*) and injury prevention, first aid, cardiopulmonary resuscitation, precautions against contamination by bloodborne pathogens, and promotion of other healthy behaviors (e.g., dietary behavior).

Recommendation 8. Health services: Assess physical activity patterns among young people, counsel them about physical activity, refer them to appropriate programs, and advocate for physical activity instruction and programs for young people.

Physicians, school nurses, and other people who provide health services to young people have a key role in promoting healthy behaviors. Health-care providers are important in promoting physical activity, especially among children and adolescents who have physical and cognitive disabilities or chronic health conditions.

Regularly assess the physical activity patterns of young people, reinforce physical activity among active young people, counsel inactive young people about physical activity, and refer young people to appropriate physical activity programs.

As a routine part of care, health-care providers should assess the physical activity of their young patients (*117,164,230,231,258,269*). Young people and their families should be counseled about the importance of physical activity and be provided information that enable young people to initiate and maintain regular, safe, and enjoyable participation in physical activity (*3,164,230,231,239,258*). Children and adolescents who are already active should be encouraged to continue their physical activity. Health-care providers should work with inactive young people and their families to develop exercise prescriptions and should refer these young people to school and community physical activity programs appropriate to the youths' needs and interests (*117,258*). Children with chronic diseases, risk factors for chronic diseases, and physical and cognitive disabilities have special physical activity needs (*257,269*). Obese children and adolescents, for example, should be referred to a physical activity and nutrition program for overweight young people.

Advocate for school and community physical activity instruction and programs that meet the needs of young people.

To help create physical and social environments that encourage physical activity, health-care providers should advocate for physical education curricula, extracurricular

activities, and community sports and recreation programs that emphasize lifetime physical activities and that enable participation in safe, enjoyable physical activities (*116,239,257,258*). Physicians, school nurses, and other health-care professionals can support physical activity among children and adolescents by becoming involved in school and community physical activity initiatives. Within schools, many nurses are already involved in joint activities or projects with physical education teachers and health education teachers (*270*). Physicians can volunteer to serve as advisors to schools and other community organizations that provide physical activity instruction and programs to young people (*269*). Health-care providers should advocate that coaches be trained to ensure that young people compete safely and thrive physically, emotionally, and socially (*271*). Health-care providers also should encourage parents to be role models for their children, plan physical activities that involve the whole family, and discuss with their children the value of healthy behaviors such as physical activity (*117,231,239,258,269*).

Recommendation 9. Community programs: Provide a range of developmentally appropriate community sports and recreation programs that are attractive to all young people.

Most physical activity among children and adolescents occurs outside the school setting (*129*). Thus, community sports and recreation programs are integral to promoting physical activity among young people (*3*). These community programs can complement the efforts of schools by providing children and adolescents opportunities to engage in the types and levels of physical activity that may not be offered in school. Community sports and recreation programs also provide an avenue for reaching out-of-school young people.

Provide a diversity of developmentally appropriate community sports and recreation programs for all young people.

Young people become involved in structured physical activity programs for various reasons: to develop competence, to build social relationships, to enhance fitness, and to have fun (*145,272*). However, adolescents' participation in community sports and recreation programs declines with age (*48,145*). Many young people drop out of these programs because the activities are not fun, are too competitive, or demand too much time (*145,256*). Because definitions of fun and success vary with each person's age, sex, and skill level, community sports and recreation programs should assess and try to meet the needs and interests of all young people. These programs should also try to match the skill level of the participants with challenges that encourage skill development and fun and to develop programs that are not based exclusively on winning (*145,255*).

Provide access to community sports and recreation programs for young people.

In most communities, physical activity programs for young people exist, but these opportunities often require transportation, fees, or special equipment. These limitations often discourage children and adolescents from low-income families from participating. Communities should ensure that all young people, irrespective of their

family's income, have access to these programs. For example, community sports and recreation programs can collaborate with schools and other community organizations (e.g., places of worship) to provide transportation to these programs. Communities can also ask businesses to sponsor youth physical activity programs and to provide children and adolescents from low-income families appropriate equipment, clothing, and footwear for participation in physical activity.

Recommendation 10. Evaluation: Regularly evaluate school and community physical activity instruction, programs, and facilities.

Evaluation can be used to assess and improve physical activity policies, spaces and facilities, instruction, programs, personnel training, health services, and student achievement. All groups involved in and affected by school and community programs to promote lifelong physical activity among young people should have the opportunity to contribute to evaluation. Valid evaluations may increase support for and involvement in these programs by students, parents, teachers, and other school and community personnel.

Evaluate the implementation and quality of physical activity policies, curricula, instruction, programs, and personnel training.

Evaluation is useful for gaining insight about the implementation and quality of physical activity policies, physical activity spaces and facilities, physical education and health education curricula and instruction, extracurricular and community sports and recreation programs, and pre-service and in-service training programs for personnel. The Child and Adolescent Trial for Cardiovascular Health (CATCH) (*180*) has developed a model that can be used to assess the quantity and quality of physical education instruction, lesson content, fidelity of curriculum implementation, and opportunities for other physical activity (*273,274*). National competency frameworks, including *Quality Sports, Quality Coaches: National Standards for Athletic Coaches* (*213*), *National Standards for Beginning Physical Education Teachers* (*265*), *A Guide for the Development of Competency-Based Curricula for Entry Level Health Educators* (*266*), and *Health Instruction Responsibilities and Competencies for Elementary (K–6) Classroom Teachers* (*267*) can be used to assess the competencies of coaches, entry-level physical education and health education teachers, and elementary school teachers and the quality of professional training programs for these people. Parents and guardians can use the checklist developed by the National Association for Sport and Physical Education to evaluate the quality of sports and physical activity programs for their children (*275*). Other guidelines exist to assess the provision of health services for children and adolescents (*231,258*) and the safety of playgrounds (*225,226*).

Measure students' attainment of physical activity knowledge, achievement of motor skills and behavioral skills, and adoption of healthy behaviors.

Measuring students' achievement in physical education requires a comprehensive assessment of their knowledge, motor and behavioral skills, and behavior related to physical activity. Measuring students' achievement in health education requires an assessment of their knowledge, behavioral skills, and behaviors. *Moving into the Future:*

National Standards for Physical Education (*211*) and *National Health Education Standards: Achieving Health Literacy* (*208*) describe what students should know and be able to do as a result of comprehensive physical education and health education programs. Student's achievement may be measured using paper-and-pencil tests that assess knowledge and performance tests that assess motor and behavioral skills. Portfolios of students' work that reflect their knowledge, motor and behavioral skills, and progress toward personal physical activity goals are appropriate for assessing students' achievement (*276*). Although fitness testing is a common component of many school physical education programs, the test results should not be used to assign report card grades or assess program effectiveness (*193,240,241*).

CONCLUSION

School and community programs that promote regular physical activity among young people could be among the most effective strategies for reducing the public health burden of chronic diseases associated with sedentary lifestyles. Programs that provide students with the knowledge, attitudes, motor skills, behavioral skills, and confidence to participate in physical activity may establish active lifestyles among young people that continue into and throughout their adult lives. These programs can promote physical activity by establishing physical activity policies; providing physical and social environments that enable safe and enjoyable participation in physical activity; implementing planned and sequential physical education and health education curricula and instruction from kindergarten through 12th grade; providing extracurricular physical activity programs; including parents and guardians in physical activity instruction and programs; providing personnel training in methods to effectively promote physical activity; providing health services that encourage and support physical activity; providing community-based sports and recreation programs; and evaluating school and community physical activity instruction, programs, and facilities.

References

1. U.S. Department of Health and Human Services. Physical activity and health: a report of the Surgeon General. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 1996.
2. McGinnis JM. The public health burden of a sedentary lifestyle. Med Sci Sports Exercise 1992;24(6 suppl):S196–S200.
3. Pate RR, Pratt M, Blair SN, et al. Physical activity and public health: a recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. JAMA 1995;273(5):402–7.
4. Powell KE, Blair SN. The public health burdens of sedentary living habits: theoretical but realistic estimates. Med Sci Sports Exercise 1994;26(7):851–6.
5. Morris JN. Exercise in the prevention of coronary heart disease: today's best buy in public health. Med Sci Sports Exercise 1994;26(7):807–14.
6. McGinnis JM, Foege WH. Actual causes of death in the United States. JAMA 1993; 270(18):2207–12.
7. Hahn RA, Teutsch SM, Rothenberg RB, Marks JS. Excess deaths from nine chronic diseases in the United States, 1986. JAMA 1990;264(20):2654–9.
8. Powell KE, Kreuter MW, Stephens T, Marti B, Heinemann L. The dimensions of health promotion applied to physical activity. J Public Health Policy 1991;12(4):492–509.

9. Kaplan GA, Seeman TE, Cohen RD, Knudsen LP, Guralnik J. Mortality among the elderly in the Alameda County Study: behavioral and demographic risk factors. Am J Public Health 1987;77(3):307–12.
10. Slattery ML, Jacobs DR Jr, Nichaman MZ. Leisure time physical activity and coronary heart disease death: the US Railroad Study. Circulation 1989;79:304–11.
11. Leon AS, Connett J. Physical activity and 10.5 year mortality in the Multiple Risk Factor Intervention Trial (MRFIT). Int J Epidemiol 1991;20(3):690–7.
12. Linsted KD, Tonstad S, Kuzma JW. Self-report of physical activity and patterns of mortality in Seventh-Day Adventist men. J Clin Epidemiol 1991;44(4/5):355–64.
13. Chang-Claude J, Frentzel-Beyme R. Dietary and lifestyle determinants of mortality among German vegetarians. Int J Epidemiol 1993;22(2):228–36.
14. Paffenbarger RS Jr, Hyde RT, Wing AL, Lee I-M, Jung DL, Kampert JB. The association of changes in physical-activity level and other lifestyle characteristics with mortality among men. N Engl J Med 1993;328:538–45.
15. Paffenbarger RS Jr, Hyde RT, Wing AL, Lee I-M, Kampert JB. Some interrelations of physical activity, physiological fitness, health, and longevity. In: Bouchard C, Shephard RJ, Stephens T, eds. Physical activity, fitness, and health: international proceedings and consensus statement. Champaign, IL: Human Kinetics, 1994:119–33.
16. Paffenbarger RS Jr, Kampert JB, Lee I-M, Hyde RT, Leung RW, Wing AL. Changes in physical activity and other lifeway patterns influencing longevity. Med Sci Sports Exercise 1994; 26(7):857–65.
17. Lee I-M, Hsieh C-C, Paffenbarger RS Jr. Exercise intensity and longevity in men: the Harvard Alumni Health Study. JAMA 1995;273(15):1179–84.
18. Haapanen N, Miilunpalo S, Vuori I, Oja P, Pasanen M. Characteristics of leisure time physical activity associated with decreased risk of premature all-cause and cardiovascular disease mortality in middle-aged men. Am J Epidemiol 1996;143(9):870–80.
19. Lapidus L, Bengtsson C. Socioeconomic factors and physical activity in relation to cardiovascular disease and death: a 12 year follow up of participants in a population study of women in Gothenburg, Sweden. Br Heart J 1986;55:295–301.
20. Kannel WB, Belanger A, D'Agostino R, Israel I. Physical activity and physical demand on the job and risk of cardiovascular disease and death: the Framingham Study. Am Heart J 1986; 112(4):820–5.
21. Leon AS, Connett J, Jacobs DR Jr, Rauramaa R. Leisure-time physical activity levels and risk of coronary heart disease and death: the Multiple Risk Factor Intervention Trial. JAMA 1987; 258(17):2388–95.
22. Donahue RP, Abbott RD, Reed DM, Yano K. Physical activity and coronary heart disease in middle-aged and elderly men: the Honolulu Heart Program. Am J Public Health 1988;78(6): 683–5.
23. Pekkanen J, Nissinen A, Marti B, Tuomilehto J, Punsar S, Karvonen MJ. Reduction of premature mortality by high physical activity: a 20-year follow-up of middle-aged Finnish men. Lancet 1987;1(8548):1473–7.
24. Salonen JT, Slater JS, Tuomilehto J, Rauramaa R. Leisure time and occupational physical activity: risk of death from ischemic heart disease. Am J Epidemiol 1988;127(1):87–94.
25. Arraiz GA, Wigle DT, Mao Y. Risk assessment of physical activity and physical fitness in the Canada health survey mortality follow up study. J Clin Epidemiol 1992;45(4):419–28.
26. Hein HO, Suadicani P, Gyntelberg F. Physical fitness or physical activity as a predictor of ischaemic heart disease? A 17-year follow-up in the Copenhagen Male Study. J Intern Med 1992;232:471–9.
27. Rodriguez BL, Curb JD, Burchfiel CM, et al. Physical activity and 23-year incidence of coronary heart disease morbidity and mortality among middle-aged men: the Honolulu Heart Program. Circulation 1994;89:2540–4.
28. Gartside PS, Glueck CJ. The important role of modifiable dietary and behavioral characteristics in the causation and prevention of coronary heart disease hospitalization and mortality: the prospective NHANES I follow-up study. J Am Coll Nutr 1995;14(1):71–9.
29. Yeager KK, Anda RF, Macera CA, Donehoo RS, Eaker ED. Sedentary lifestyle and state variation in coronary heart disease mortality. Public Health Rep 1995;110(1):100–2.

30. Paffenbarger RS Jr, Wing AL, Hyde RT, Jung DL. Physical activity and incidence of hypertension in college alumni. Am J Epidemiol 1983;117(3):245–57.
31. Stamler R, Stamler J, Gosch FC, et al. Primary prevention of hypertension by nutritional-hygienic means: final report of a randomized, controlled trial. JAMA 1989;262(13):1801–7.
32. Folsom AR, Prineas RJ, Kaye SA, Munger RG. Incidence of hypertension and stroke in relation to body fat distribution and other risk factors in older women. Stroke 1990;21:701–6.
33. Helmrich SP, Ragland DR, Leung RW, Paffenbarger RS Jr. Physical activity and reduced occurrence of non-insulin-dependent diabetes mellitus. N Engl J Med 1991;325(3):147–52.
34. Manson JE, Rimm EB, Stampfer MJ, et al. Physical activity and incidence of non-insulin-dependent diabetes mellitus in women. Lancet 1991;338:774–8.
35. Manson JE, Nathan DM, Krolewski AS, Stampfer MJ, Willett WC, Hennekens CH. A prospective study of exercise and incidence of diabetes among US male physicians. JAMA 1992;268(1):63–7.
36. Helmrich SP, Ragland DR, Paffenbarger RS Jr. Prevention of non-insulin-dependent diabetes mellitus with physical activity. Med Sci Sports Exercise 1994;26(7):824–30.
37. Burchfiel CM, Sharp DS, Curb JD, et al. Physical activity and incidence of diabetes: the Honolulu Heart Program. Am J Epidemiol 1995;141(4):360–8.
38. Gerhardsson M, Floderus B, Norell SE. Physical activity and colon cancer risk. Int J Epidemiol 1988;17(4):743–6.
39. Slattery ML, Schumacher MC, Smith KR, West DW, Abd Elghany N. Physical activity, diet, and risk of colon cancer in Utah. Am J Epidemiol 1988;128(5):989–99.
40. Gerhardsson de Verdier M, Steineck G, Hagman U, Rieger A, Norell SE. Physical activity and colon cancer: a case-referent study in Stockholm. Int J Cancer 1990;46:985–9.
41. Whittemore AS, Wu Williams AH, Lee M, et al. Diet, physical activity, and colorectal cancer among Chinese in North American and China. J Natl Cancer Inst 1990;82(11):915–26.
42. Lee I-M, Paffenbarger RS Jr, Hsieh C-C. Physical activity and risk of developing colorectal cancer among college alumni. J Natl Cancer Inst 1991;83:1324–9.
43. Markowitz S, Morabia A, Garibaldi K, Wynder E. Effect of occupational and recreational activity on the risk of colorectal cancer among males: a case-control study. Int J Epidemiol 1992;21(6):1057–62.
44. Giovannucci E, Ascherio A, Rimm EB, Colditz GA, Stampfer MJ, Willet WC. Physical activity, obesity, and risk for colon cancer and adenoma in men. Ann Intern Med 1995;122:327–34.
45. Longnecker MP, Gerhardsson de Verdier M, Frumkin H, Carpenter C. A case-control study of physical activity in relation to risk of cancer of the right colon and rectum in men. Int J Epidemiol 1995;24(1):42–50.
46. Siegel PZ, Brackbill RM, Frazier EL, et al. Behavioral risk factor surveillance, 1986–1990. MMWR 1991;40(SS-4):1–22.
47. Adams PF, Schoenborn CA, Moss AJ, Warren CW, Kann L. Health-risk behaviors among our nation's youth: United States, 1992. Hyattsville, MD: U.S. Department of Health and Human Services, Public Health Service, CDC, 1995. DHHS publication no. (PHS) 95-1520. (Vital and health statistics; series 10, no. 192.)
48. CDC. Youth Risk Behavior Surveillance—United States, 1995. MMWR 1996;45(SS-4).
49. Kolbe LJ. An essential strategy to improve the health and education of Americans. Prev Med 1993;22:544–60.
50. McGinnis JM. The year 2000 initiative: implications for comprehensive school health. Prev Med 1993;22:493–8.
51. CDC. Guidelines for school health programs to promote lifelong healthy eating. MMWR 1996;45(RR-9):1–41.
52. CDC. Guidelines for effective school health education to prevent the spread of AIDS. MMWR 1988;37(S-2):1–14.
53. CDC. Guidelines for school health programs to prevent tobacco use and addiction. MMWR 1994;43(RR-2):1–18.
54. Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. Public Health Rep 1985;100(2):126–31.
55. Bouchard C, Shephard RJ. Physical activity, fitness, and health: the model and key concepts. In: Bouchard C, Shephard RJ, Stephens T, eds. Physical activity, fitness, and health: international proceedings and consensus statement. Champaign, IL: Human Kinetics, 1994:77–88.

56. Dannenberg AL, Keller JB, Wilson PWF, Castelli WP. Leisure time physical activity in the Framingham Offspring Study. Am J Epidemiol 1989;129(1):76–88.
57. Slattery ML, McDonald A, Bild DE, et al. Associations of body fat and its distribution with dietary intake, physical activity, alcohol, and smoking in blacks and whites. Am J Clin Nutr 1992;55:943–9.
58. Williamson DF, Madans J, Anda RF, Kleinman JC, Kahn HS, Byers T. Recreational physical activity and ten-year weight change in a US national cohort. Int J Obes 1993;17:279–86.
59. French SA, Jeffery RW, Forster JL, McGovern PG, Kelder SH, Baxter JE. Predictors of weight change over two years among a population of working adults: the Healthy Worker Project. Int J Obes 1994;18:145–54.
60. Ching PLYH, Willett WC, Rimm EB, Colditz GA, Gortmaker SL, Stampfer MJ. Activity level and risk of overweight in male health professionals. Am J Public Health 1996;86(1):25–30.
61. Farmer ME, Locke BZ, Mocicki EK, Dannenberg AL, Larson DB, Radloff LS. Physical activity and depressive symptoms: the NHANES I Epidemiologic Follow-up Study. Am J Epidemiol 1988;128(6):1340–51.
62. Ross CE, Hayes D. Exercise and psychologic well-being in the community. Am J Epidemiol 1988;127(4):762–71.
63. Stephens T. Physical activity and mental health in the United States and Canada: evidence from four population surveys. Prev Med 1988;17:35–47.
64. Camacho TC, Roberts RE, Lazarus NB, Kaplan GA, Cohen RD. Physical activity and depression: evidence from the Alameda County Study. Am J Epidemiol 1991;134(2):220–31.
65. Weyerer S. Physical inactivity and depression in the community. Int J Sports Med 1992; 13(6):492–6.
66. Lane NE, Bloch DA, Jones HH, Marshall WH, Wood PD, Fries JF. Long-distance running, bone density, and osteoarthritis. JAMA 1986;255(9):1147–51.
67. Aloia JF, Vaswani AN, Yeh JK, Cohn SH. Premenopausal bone mass is related to physical activity. Arch Intern Med 1988;148:121–3.
68. Dalsky GP, Stocke KS, Ehsani AA, Slatopolsky E, Lee WC, Birge SJ Jr. Weight-bearing exercise training and lumbar bone mineral content in postmenopausal women. Ann Intern Med 1988; 108:824–8.
69. Michel BA, Bloch DA, Fries JF. Weight-bearing exercise, overexercise, and lumbar bone density over age 50 years. Arch Intern Med 1989;149:2325–9.
70. Pruitt LA, Jackson RD, Bartels RL, Lehnhard HJ. Weight-training effects on bone mineral density in early postmenopausal women. J Bone Miner Res 1992;7(2):179–85.
71. Greendale GA, Barrett Connor E, Edelstein S, Ingles S, Haile R. Lifetime leisure exercise and osteoporosis: the Rancho Bernardo Study. Am J Epidemiol 1995;141(10):951–9.
72. Sobolski J, Kornitzer M, De Backer G, et al. Protection against ischemic heart disease in the Belgian Fitness Study: physical fitness rather than physical activity? Am J Epidemiol 1987; 125(4):601–10.
73. Ekelund L-G, Haskell WL, Johnson JL, Whaley FS, Criqui MH, Sheps DS. Physical fitness as a predictor of cardiovascular mortality in asymptomatic North American men. N Engl J Med 1988;319(21):1379–84.
74. Slattery ML, Jacobs DR Jr. Physical fitness and cardiovascular disease mortality: the US Railroad Study. Am J Epidemiol 1988;127(3):571–80.
75. Blair SN, Kohl HW III, Paffenbarger RS Jr, Clark DG, Cooper KH, Gibbons LW. Physical fitness and all-cause mortality. JAMA 1989;262(17):2395–401.
76. Sandvik L, Erikssen J, Thaulow E, Erikssen G, Mundal R, Rodahl K. Physical fitness as a predictor of mortality among healthy, middle-aged Norwegian men. N Engl J Med 1993; 328(8):533–7.
77. Blair SN, Kohl HW III, Barlow CE, Paffenbarger RS Jr, Gibbons LW, Macera CA. Changes in physical fitness and all cause mortality: a prospective study of healthy and unhealthy men. JAMA 1995;273(14):1093–8.
78. Blair SN, Goodyear NN, Gibbons LW, Cooper KH. Physical fitness and incidence of hypertension in healthy normotensive men and women. JAMA 1984;252(4):487–90.
79. Bar-Or O, Baranowski T. Physical activity, adiposity, and obesity among adolescents. Pediatr Exercise Sci 1994;6:348–60.

80. Armstrong N, Simons-Morton B. Physical activity and blood lipids in adolescents. Pediatr Exercise Sci 1994;6:381–405.
81. Alpert BS, Wilmore JH. Physical activity and blood pressure in adolescents. Pediatr Exercise Sci 1994;6:361–80.
82. Dotson CO, Ross JG. Relationships between activity patterns and fitness. J Physical Educ Recreation Dance 1985;56(1):86–90.
83. Pate RR, Ross JG. Factors associated with health-related fitness. J Physical Educ Recreation Dance 1987;58(9):93–5.
84. Tell GS, Vellar OD. Physical fitness, physical activity, and cardiovascular disease risk factors in adolescents: the Oslo Youth Study. Prev Med 1988;17:12–24.
85. Aaron DJ, Kriska AM, Dearwater SR, et al. The epidemiology of leisure physical activity in an adolescent population. Med Sci Sports Exercise 1993;25(7):847–53.
86. Sallis JF, McKenzie TL, Alcaraz JE. Habitual physical activity and health-related physical fitness in fourth-grade children. Am J Dis Child 1993;147:890–6.
87. Berkowitz RI, Agras WS, Korner AF, Kraemer HC, Zeanah CH. Physical activity and adiposity: a longitudinal study from birth to childhood. J Pediatr 1985;106:734–8.
88. Fripp RR, Hodgson JL, Kwiterovich PO, Werner JC, Schuler HG, Whitman V. Aerobic capacity, obesity, and atherosclerotic risk factors in male adolescents. Pediatrics 1985;75(5):813–8.
89. Sallis JF, Patterson TL, Buono MJ, Nader PR. Relation of cardiovascular fitness and physical activity to cardiovascular disease risk factors in children and adults. Am J Epidemiol 1988; 127(5):933–41.
90. Treiber FA, Strong WB, Arensman RW, Gruber M. Relationship between habitual physical activity and cardiovascular responses to exercise in young children. In: Oseid S, Carlsen K-H, eds. Children and exercise XIII. Champaign, IL: Human Kinetics, 1989:285–93.
91. Gutin B, Basch C, Shea S, et al. Blood pressure, fitness, and fatness in 5- and 6-year-old children. JAMA 1990;264(9):1123–7.
92. Suter E, Howes MR. Relationship of physical activity, body fat, diet, and blood lipid profile in youths 10–15 yr. Med Sci Sports Exercise 1993;25(6):748–54.
93. Blessing DL, Keith RE, Williford HN, Blessing ME, Barksdale JA. Blood lipid and physiological responses to endurance training in adolescents. Pediatr Exercise Sci 1995;7:192–202.
94. Zonderland ML, Erich WBM, Kortlandt W, Erkelens DW. Additional physical education and plasma lipids and apoproteins: a 3-year intervention study. Pediatr Exercise Sci 1994;6:128–39.
95. Panico S, Celentano E, Krogh V, et al. Physical activity and its relationship to blood pressure in school children. J Chron Dis 1987;40(10):925–30.
96. Strazzullo P, Cappuccio FP, Trevisan M, et al. Leisure time physical activity and blood pressure in schoolchildren. Am J Epidemiol 1988;127:726–33.
97. Brandon LJ, Fillingim J. Health fitness training responses of normotensive and elevated normotensive children. Am J Health Promot 1990;5(1):30–5.
98. Hansen HS, Froberg K, Hyldebrandt N, Nielsen JR. A controlled study of eight months of physical training and reduction of blood pressure in children: the Odense schoolchild study. Br Med J 1991;303:682–5.
99. Bazzano C, Cunningham LN, Varrassi G, Falconio T. Health related fitness and blood pressure in boys and girls ages 10 to 17 years. Pediatr Exercise Sci 1992;4:128–35.
100. Shea S, Basch CE, Gutin B, et al. The rate of increase in blood pressure in children 5 years of age is related to changes in aerobic fitness and body mass index. Pediatrics 1994;94(4): 465–70.
101. Tomassoni TL. Introduction: the role of exercise in the diagnosis and management of chronic disease in children and youth. Med Sci Sports Exercise 1996;28(4):403–5.
102. Nixon PA. Role of exercise in the evaluation and management of pulmonary disease in children and youth. Med Sci Sports Exercise 1996;28(4):414–20.
103. Tomassoni TL. Role of exercise in the management of cardiovascular disease in children and youth. Med Sci Sports Exercise 1996;28(4):406–13.
104. Bar-Or O. Role of exercise in the assessment and management of neuromuscular disease in children. Med Sci Sports Exercise 1996;28(4):421–7.
105. Epstein LH, Coleman KJ, Myers MD. Exercise in treating obesity in children and adolescents. Med Sci Sports Exercise 1996;28(4):428–35.

106. Ignico AA, Mahon AD. The effects of a physical fitness program on low-fit children. Res Q Exercise Sport 1995;66(1):85–90.
107. Gutin B, Cucuzzo N, Islam S, Smith C, Stachura ME. Physical training, lifestyle education, and coronary risk factors in obese girls. Med Sci Sports Exercise 1996;28(1):19–23.
108. Brownell KD, Kaye FS. A school-based behavior modification, nutrition education, and physical activity program for obese children. Am J Clin Nutr 1982;35:277–83.
109. Sasaski J, Shindo M, Tanaka H, Ando M, Arakawa K. A long term aerobic exercise program decreases the obesity index and increases the high density lipoprotein cholesterol concentration in obese children. Int J Obesity 1987;11:339–45.
110. Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year follow-up of behavioral, family-based treatment for obese children. JAMA 1990;264(19):2519–23.
111. Epstein LH, Valoski AM, Vara LS, et al. Effects of decreasing sedentary behavior and increasing activity on weight change in obese children. Health Psychol 1995;14(2):109–15.
112. Calfas KJ, Taylor WC. Effects of physical activity on psychological variables in adolescents. Pediatr Exercise Sci 1994;6:406–23.
113. Bailey DA, Martin AD. Physical activity and skeletal health in adolescents. Pediatr Exercise Sci 1994;6:330–47.
114. McCulloch RG, Bailey DA, Whalen RL, Houston CS, Faulkner RA, Craven BR. Bone density and bone mineral content of adolescent soccer athletes and competitive swimmers. Pediatr Exercise Sci 1992;4:319–30.
115. Rubin K, Schirduan V, Gendreau P, Sarfarazi M, Mendola R, Dalsky G. Predictors of axial and peripheral bone mineral density in healthy children and adolescents, with special attention to the role of puberty. J Pediatr 1993;123:863–70.
116. American College of Sports Medicine. Opinion statement on physical fitness in children and youth. Med Sci Sports Exercise 1988;20(4):422–3.
117. Fletcher GF, Blair SN, Blumenthal J, et al. Statement on exercise. Benefits and recommendations for physical activity programs for all Americans. Circulation 1992;86(1):340–4.
118. American Heart Association. Strategic plan for promoting physical activity. Dallas, TX: American Heart Association, 1995.
119. Ibrahim MA, Yankauer A. The promotion of exercise. Am J Public Health 1988;78(11):1413–4.
120. Iverson DC, Fielding JE, Crow RS, Christenson GM. The promotion of physical activity in the United States population: the status of programs in medical, worksite, community, and school settings. Public Health Rep 1985;100(2):212–23.
121. King AC. Community and public health approaches to the promotion of physical activity. Med Sci Sports Exercise 1994;26(11):1405–12.
122. King AC, Jeffery RW, Fridinger FW, et al. Environmental and policy approaches to cardiovascular disease prevention through physical activity: issues and opportunities. Health Educ Q 1995;22(44):499–511.
123. Schmid TL, Pratt M, Howze E. Policy as intervention: environmental and policy approaches to the prevention of cardiovascular disease. Am J Public Health 1995;85(9):1207–11.
124. Owen N, Lee C. Development of behaviorally-based policy guidelines for the promotion of exercise. J Public Health Policy 1989;10(1):43–61.
125. McGinnis JM, Kanner L, DeGraw C. Physical education's role in achieving national health objectives. Res Q Exercise Sport 1991;62(2):138–42.
126. Winkleby MA. The future of community-based cardiovascular disease intervention studies. Am J Public Health 1994;84(9):1369–72.
127. Blair SN, Booth M, Gyarfas I, et al. Development of public policy and physical activity initiatives internationally. Sports Med 1996;21(3):157–63.
128. Sallis JF, Patrick K. Physical activity guidelines for adolescents: consensus statement. Pediatr Exercise Sci 1994;6:302–14.
129. Simons-Morton BG, O'Hara NM, Parcel GS, Huang IW, Baranowski T, Wilson B. Children's frequency of participation in moderate to vigorous physical activities. Res Q Exercise Sport 1990;61(4):307–14.
130. Pate RR, Long BJ, Heath G. Descriptive epidemiology of physical activity in adolescents. Pediatr Exercise Sci 1994;6:434–47.
131. Sallis JF. Epidemiology of physical activity and fitness in children and adolescents. Crit Rev Food Sci Nutr 1993;33(4/5):403–8.

132. Kelder SH, Perry CL, Peters RJ Jr, Lytle LL, Klepp K-I. Gender differences in the Class of 1989 Study: the school component of the Minnesota Heart Health Program. J Health Educ 1995;26 (2 suppl):S36–S44.
133. Zakarian JM, Hovell MF, Hofstetter CR, Sallis JF, Keating KJ. Correlates of vigorous exercise in a predominantly low SES and minority high school population. Prev Med 1994;23:314–21.
134. Robinson TN, Killen JD. Ethnic and gender differences in the relationships between television viewing and obesity, physical activity, and dietary fat intake. J Health Educ 1995;26(2 suppl): S91–S98.
135. Reynolds KD, Killen JD, Bryson SW, et al. Psychosocial predictors of physical activity in adolescents. Prev Med 1990;19:541–51.
136. Trost SG, Pate RR, Dowda M, Saunders R, Ward DS, Felton G. Gender differences in physical activity and determinants of physical activity in rural fifth grade children. J Sch Health 1996; 66(4):145–50.
137. Tappe MK, Duda JL, Menges Ehrnwald P. Personal investment predictors of adolescent motivational orientation toward exercise. Can J Sport Sci 1990;15(3):185–92.
138. Ferguson KJ, Yesalis CE, Pomrehn PR, Kirkpatrick MB. Attitudes, knowledge, and beliefs as predictors of exercise intent and behavior in schoolchildren. J Sch Health 1989;59(3):112–5.
139. Dempsey JM, Kimiecik JC, Horn TS. Parental influence on children's moderate to vigorous physical activity participation: an expectancy-value approach. Pediatr Exercise Sci 1993;5: 151–67.
140. Biddle S, Armstrong N. Children's physical activity: an exploratory study of psychological correlates. Soc Sci Med 1992;34(3):325–31.
141. Biddle S, Goudas M. Analysis of children's physical activity and its association with adult encouragement and social cognitive variables. J Sch Health 1996;66(2):75–8.
142. Stucky-Ropp RC, DiLorenzo TM. Determinants of exercise in children. Prev Med 1993;22:880–9.
143. Tinsley BJ, Holtgrave DR, Reise SP, Erdley C, Cupp RG. Developmental status, gender, age, and self-reported decision-making influences on students' risky and preventive health behaviors. Health Educ Q 1995;22(2):244–59.
144. McCullagh P, Matzkanin KT, Shaw SD, Maldonado M. Motivation for participation in physical activity: a comparison of parent-child perceived competencies and participation motives. Pediatr Exercise Sci 1993;5:224–33.
145. Athletic Footwear Association. American youth and sports participation. North Palm Beach, FL: Athletic Footwear Association, 1990.
146. Borra ST, Schwartz NE, Spain CG, Natchipolsky MM. Food, physical activity, and fun: inspiring America's kids to more healthful lifestyles. J Am Diet Assoc 1995;95(7):816–8.
147. Godin G, Shephard RJ. Psychosocial factors influencing intentions to exercise of young students from grades 7 to 9. Res Q Exercise Sport 1986;57(1):41–52.
148. Tappe MK, Duda JL, Ehrnwald PM. Perceived barriers to exercise among adolescents. J Sch Health 1989;59(4):153–5.
149. Marcus BH, Eaton CA, Ross JS, Harlow LL. Self-efficacy, decision-making, and stages of change: an integrative model of physical exercise. J Appl Soc Psychol 1994;24(6):489–508.
150. Calfas KJ, Sallis JF, Lovato CY, Campbell J. Physical activity and its determinants before and after college graduation. Med Exercise Nutr Health 1994;3:323–34.
151. Cardinal BJ. The stages of exercise scale and stages of exercise behavior in female adults. J Sports Med Physical Fitness 1995;35(2):87–92.
152. Marcus BH, Simkin LR. The transtheoretical model: applications to exercise behavior. Med Sci Sports Exercise 1994;26(11):1400–4.
153. Armstrong CA, Sallis JF, Hovell MF, Hofstetter CR. Stages of change, self-efficacy, and the adoption of vigorous exercise: a prospective analysis. J Sport Exercise Psychol 1993;15: 390–402.
154. Anderssen N, Wold B. Parental and peer influences on leisure-time physical activity in young adolescents. Res Q Exercise Sport 1992;63(4):341–8.
155. Perusse L, Tremblay A, LeBlanc C, Bouchard C. Genetic and environmental influences on level of habitual physical activity and exercise participation. Am J Epidemiol 1989;129(5):1012–22.
156. Sallis JF, Patterson TL, Buono MJ, Atkins CJ, Nader PR. Aggregation of physical activity habits in Mexican-American and Anglo families. J Behav Med 1988;11(1):31–41.

157. Butcher J. Longitudinal analysis of adolescent girls' participation in physical activity. Sociol Sport J 1985;2:130–43.
158. Sallis JF, Alcaraz JE, McKenzie TL, Hovell MF, Kolody B, Nader PR. Parental behavior in relation to physical activity and fitness in 9-year-old children. Am J Dis Child 1992;146:1383–8.
159. McMurray RG, Bradley CB, Harrell JS, Bernthal PR, Frauman AC, Bangdiwala SI. Parental influences on childhood fitness and activity patterns. Res Q Exercise Sport 1993;64(3):249–55.
160. Garcia AW, Norton Broda MA, Frenn M, Coviak C, Pender NJ, Ronis DL. Gender and developmental differences in exercise beliefs among youth and prediction of their exercise behavior. J Sch Health 1995;65(6):213–9.
161. Freedson PS, Evenson S. Familial aggregation in physical activity. Res Q Exercise Sport 1991; 62(4):384–9.
162. Gottlieb NH, Chen M-S. Sociocultural correlates of childhood sporting activities: their implications for heart health. Soc Sci Med 1985;21(5):533–9.
163. Poest CA, Williams JR, Witt DD, Atwood ME. Physical activity patterns of preschool children. Early Childhood Res Q 1989;4:367–76.
164. Public Health Service. Healthy People 2000: national health promotion and disease prevention objectives. Full report, with commentary. Washington, DC: U.S. Department of Health and Human Services, Public Health Service, 1991. DHHS publication no. (PHS) 91-50212.
165. Nicklas TA, Webber LS, Johnson CC, Srinivasan SR, Berenson GS. Foundations for health promotion with youth: a review of observations from the Bogalusa Heart Study. J Health Educ 1995;26(2 suppl):S18–S26.
166. Troiano RP, Flegal KM, Kuczmarksi RJ, Campbell SM, Johnson CL. Overweight prevalence and trends for children and adolescents. Arch Pediatr Adolesc Med 1995;149:1085–91.
167. Kelder SH, Perry CL, Klepp K-I, Lytle LL. Longitudinal tracking of adolescent smoking, physical activity, and food choice behaviors. Am J Public Health 1994;84(7):1121–6.
168. Public Health Service. Healthy People 2000: midcourse review and 1995 revisions. Washington, DC: U.S. Department of Health and Human Services, Public Health Service, 1995.
169. Kann L, Collins JL, Pateman BC, Small ML, Ross JG, Kolbe LJ. The School Health Policies and Programs Study (SHPPS): rationale for a nationwide status report on school health programs. J Sch Health 1995;65(8):291–4.
170. Ross JG, Dotson CO, Gilbert GG, Katz SJ. After physical education.... Physical activity outside of school physical education programs. J Physical Educ Recreation Dance 1985;56(1):77–81.
171. CDC. Promoting physical activity: a guide for community action. Atlanta: U.S. Department of Health and Human Services, Public Health Service, CDC (in press).
172. Allensworth D, Wyche J, Lawson E, Nicholson L, eds. Defining a comprehensive school health program: an interim statement. Washington, DC: National Academy Press, 1995.
173. Kolbe LJ, Kann L, Collins JL, Small ML, Pateman BC, Warren CW. The School Health Policies and Programs Study (SHPPS): context, methods, general findings, and future efforts. J Sch Health 1995;65(8):339–43.
174. Bush PJ, Zuckerman AE, Theiss PK, et al. Cardiovascular risk factor prevention in black schoolchildren: two-year results of the "Know Your Body" program. Am J Epidemiol 1989; 129(3):466–82.
175. Bush PJ, Zuckerman AE, Taggart VS, Theiss PK, Peleg EO, Smith SA. Cardiovascular risk factor prevention in black school children: the "Know Your Body" evaluation project. Health Educ Q 1989;16(2):215–27.
176. Simons-Morton BG, Parcel GS, O'Hara NM. Implementing organizational changes to promote healthful diet and physical activity at school. Health Educ Q 1988;15(1):115–30.
177. Simons-Morton BG, Parcel GS, Baranowski T, Forthofer R, O'Hara NM. Promoting physical activity and a healthful diet among children: results of a school-based intervention study. Am J Public Health 1991;81(8):986–91.
178. Parcel GS, Simons-Morton BG, O'Hara NM, Baranowski T, Kolbe LJ, Bee DE. School promotion of healthful diet and exercise behavior: an integration of organizational change and social learning theory interventions. J Sch Health 1987;57(4):150–6.
179. Luepker RV, Perry CL, McKinlay SM, et al. Outcomes of a field trial to improve children's dietary patterns and physical activity: the Child and Adolescent Trial for Cardiovascular Health (CATCH). JAMA 1996;275(10):768–76.

180. Perry CL, Stone EJ, Parcel GS, et al. School based cardiovascular health promotion: the Child and Adolescent Trial for Cardiovascular Health (CATCH). J Sch Health 1990;60(8):406–13.
181. Perry CL, Parcel GS, Stone E, et al. The Child and Adolescent Trial for Cardiovascular Health (CATCH): overview of the intervention program and evaluation methods. Cardiovasc Risk Factors 1992;2(1):36–44.
182. Stone EJ. Foreword. Health Educ Q 1994;suppl 2:S3–S4.
183. Arbeit ML, Johnson CC, Mott DS, et al. The Heart Smart cardiovascular school health promotion: behavior correlates of risk factor change. Prev Med 1992;21:18–32.
184. Butcher AH, Frank GC, Harsha DW, et al. Heart Smart: a school health program meeting the 1990 objectives for the nation. Health Educ Q 1988;5(1):17–34.
185. Downey AM, Frank GC, Webber LS, et al. Implementation of "Heart Smart:" a cardiovascular school health promotion program. J Sch Health 1987;57(3):98–104.
186. Kelder SH, Perry CL, Klepp K-I. Community wide youth exercise promotion: long-term outcomes of the Minnesota Heart Health Program and the Class of 1989 Study. J Sch Health 1993;63(5):218–23.
187. Prokhorov AV, Perry CL, Kelder SH, Klepp K-I. Lifestyle values of adolescents: results from Minnesota heart health youth program. Adolescence 1993;28(111):637–47.
188. Bandura A. Social foundations of thought and action: a social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall, 1986.
189. McKenzie TL, Sallis JF, Faucette N, Roby JJ, Kolody B. Effects of a curriculum and inservice program on the quantity and quality of elementary physical education classes. Res Q Exercise Sport 1993;64(2):178–87.
190. Duncan B, Boyce WT, Itami R, Puffenbarger N. A controlled trial of a physical fitness program for fifth grade students. J Sch Health 1983;53(8):467–71.
191. Dwyer T, Coonan WE, Worsley A, Leitch DR. An assessment of the effects of two physical activity programmes on coronary heart disease risk factors in primary school children. Community Health Stud 1979;3(3):198–202.
192. Dwyer T, Coonan WE, Leitch DR, Hetzel BS, Baghurst RA. An investigation of the effects of daily physical activity on the health of primary school students in South Australia. Int J Epidemiol 1983;12:308–13.
193. Shephard RJ, Lavallée H. Changes of physical performance as indicators of the response to enhanced physical education. J Sports Med Physical Fitness 1994;34(4):323–35.
194. Shephard RJ, Lavallée H. Impact of enhanced physical education on muscle strength of the prepubescent child. Pediatr Exercise Sci 1994;6:75–87.
195. Vandongen R, Jenner DA, Thompson C, et al. A controlled evaluation of a fitness and nutrition intervention program on cardiovascular health in 10- to 12-year-old children. Prev Med 1995; 24:9–22.
196. National Association for Sport and Physical Education. Sport and physical education advocacy kit. Reston, VA: National Association for Sport and Physical Education, 1994.
197. Pate RR, Small ML, Ross JG, Young JC, Flint KH, Warren CW. School physical education. J Sch Health 1995;65(8):312–8.
198. National Association for Sport and Physical Education. Guidelines for secondary school physical education. Reston, VA: National Association for Sport and Physical Education, 1992.
199. Connell DB, Turner RR, Mason EF. Summary of findings of the School Health Education Evaluation: health promotion effectiveness, implementation, and costs. J Sch Health 1985; 55(8):316–21.
200. The National Commission on the Role of the School and the Community in Improving Adolescent Health. Code blue: uniting for healthier youth. Alexandria, VA: National Association of State Boards of Education, 1990.
201. National School Boards Association. School health: helping children learn. Alexandria, VA: National School Boards Association, 1991.
202. Council of Chief State School Officers. Beyond the health room. Washington, DC: Council of Chief State School Officers, 1993.
203. Comprehensive School Health Education Workshop. National action plan for comprehensive school health education. J Sch Health 1993;63(1):46–53.
204. Collins JL, Small ML, Kann L, Pateman BC, Gold RS, Kolbe LJ. School health education. J Sch Health 1995;65(8):302–11.

205. Gallup Organization. Values and opinions of comprehensive school health education in US public schools: adolescents, parents, and school district administrators. Atlanta: American Cancer Society, 1994.
206. National Association for Sport and Physical Education. Guidelines for elementary school physical education. Reston, VA: National Association for Sport and Physical Education, 1994.
207. National Association for Sport and Physical Education. Guidelines for middle school physical education. Reston, VA: National Association for Sport and Physical Education, 1992.
208. Joint Committee on National Health Education Standards. National health education standards: achieving health literacy. An investment in the future. Atlanta: American Cancer Society, 1995.
209. Lavin AT. Comprehensive school health education: barriers and opportunities. J Sch Health 1993;63(1):24–7.
210. National Association for Sport and Physical Education. Appropriate practices for middle school physical education. Reston, VA: National Association for Sport and Physical Education, 1995.
211. National Association for Sport and Physical Education. Moving into the future: national standards for physical education. A guide to content and assessment. Reston, VA: Mosby, 1995.
212. McKenzie TL, Feldman H, Woods SE, et al. Children's activity levels and lesson context during third-grade physical education. Res Q Exercise Sport 1995;66(3):184–93.
213. National Association for Sport and Physical Education. Quality sports, quality coaches: national standards for athletic coaches. Reston, VA: Kendall/Hunt Publishing Company, 1995.
214. Millstein SG, Nightingale EO, Petersen AC, Mortimer AM, Hamburg DA. Promoting the healthy development of adolescents. JAMA 1993;269(11):1413–5.
215. Grahm G. Physical education through students' eyes and in students' voices: implications for teachers and researchers. J Teaching Physical Educ 1995;14:478–82.
216. Portman PA. Who is having fun in physical education classes? Experiences of sixth grade students in elementary and middle schools. J Teaching Physical Educ 1995;14:445–53.
217. Stone EJ, Baranowski T, Sallis JF, Cutler JA. Review of behavioral research for cardiopulmonary health: emphasis on youth, gender, and ethnicity. J Health Educ 1995;26(2 suppl): S9–S17.
218. Faucette N, Sallis JF, McKenzie T, Alcaraz J, Kolody B, Nugent P. Comparison of fourth grade students' out-of-school physical activity levels and choices by gender: Project SPARK. J Health Educ 1995;26(2 suppl):S82–S90.
219. Lirgg CD. Gender differences in self-confidence in physical activity: a meta-analysis of recent studies. J Sport Exercise Psychol 1991;8:294–310.
220. Pate RR, Hohn RC. Health-related physical education—A direction for the 21st century. In: Pate RR, Hohn RC, eds. Health and fitness through physical education. Champaign, IL: Human Kinetics, 1994:215–7.
221. Ward DS. Exercise for children with special needs. In: Pate RR, Hohn RC, eds. Health and fitness through physical education. Champaign, IL: Human Kinetics, 1994:99–111.
222. American Association for Active Lifestyles and Fitness and the National Association for Sport and Physical Education. Including students with disabilities in physical education. Reston, VA: National Association for Sport and Physical Education, 1995.
223. DeSensi JT. Understanding multiculturalism and valuing diversity: a theoretical perspective. Quest 1995;47:34–43.
224. Carnegie Council on Adolescent Development. A matter of time: risk and opportunity in the out-of-school hours. Recommendations for strengthening community programs for youth. New York, NY: Carnegie Corporation of New York, 1994.
225. U.S. Consumer Product Safety Commission. Handbook for public playground safety. Washington, DC: U.S. Government Printing Office, 1991. Publication no. 305-724.
226. Jambor T, Palmer SD. Playground safety manual. Birmingham, AL: Alabama Chapter of the American Academy of Pediatrics, 1991.
227. Dyment PG, ed. Sports medicine: health care for young athletes. 2nd ed. Elk Grove Village, IL: American Academy of Pediatrics, 1991.
228. Wilson MH, Baker SP, Teret SP, Shock S, Garbarino J. Saving children: a guide to injury prevention. New York, NY: Oxford University Press, 1991.
229. Macera CA, Wooten W. Epidemiology of sports and recreation injuries among adolescents. Pediatr Exercise Sci 1994;6:424–33.

230. Budetti PP, Feinson C. Ensuring adequate health care benefits for children and adolescents. In: Solloway MR, Budetti PP, eds. Child health supervision: analytical studies in the financing, delivery, and cost-effectiveness of preventive and health promotion services for infants, children, and adolescents. Arlington, VA: National Center for Education in Maternal and Child Health, 1995:77–100.
231. Green M, ed. Bright futures: guidelines for health supervision of infants, children, and adolescents. Arlington, VA: National Center for Education in Maternal and Child Health, 1994.
232. Buller DB, Callister MA, Reichert T. Skin cancer prevention by parents of young children: health information sources, skin cancer knowledge, and sun-protection practices. Oncol Nurs Forum 1995;22(10):1559–66.
233. Ross JG, Pate RR, Corbin CB, Delpy LA, Gold RS. What is going on in the elementary physical education program? J Physical Educ Recreation Dance 1987;58(9):78–84.
234. Blair SN, Collingwood TR, Reynolds R, Smith M, Hagan RD, Sterling CL. Health promotion for educators: impact on health behaviors, satisfaction, and general well-being. Am J Public Health 1984;74(2):147–9.
235. Blair SN, Smith M, Collingwood TR, Reynolds R, Prentice MC, Sterling CL. Health promotion for educators: impact on absenteeism. Prev Med 1986;15:166–75.
236. Ross JG, Gilbert GG. A summary of findings. J Physical Educ Recreation Dance 1985;56(1): 45–50.
237. Sallis JF, McKenzie TL. Physical education's role in public health. Res Q Exercise Sport 1991;62(2):124–37.
238. Pate RR, Hohn RC. A contemporary mission for physical education. In: Pate RR, Hohn RC, eds. Health and fitness through physical education. Champaign, IL: Human Kinetics, 1994:1–8.
239. American Academy of Pediatrics. Physical fitness and the schools. Pediatrics 1987;80(3): 449–50.
240. Corbin CB, Pangrazi RP. Are American children and youth fit? Res Q Exercise Sport 1992;63(2):96–106.
241. Freedson PS, Rowland TW. Youth activity level versus youth fitness: let's redirect our efforts. Res Q Exercise Sport 1992;63(2):133–6.
242. Sallis JF. Determinants of physical activity behavior in children. In: Pate RR, Hohn RC, eds. Health and fitness through physical education. Champaign, IL: Human Kinetics, 1994:31–43.
243. Silverman S. Relationship of engagement and practice trials to student achievement. J Teaching Physical Educ 1985;5:13–21.
244. Graham KC. A description of academic work and student performance in a middle school volleyball unit. J Teaching Physical Educ 1987;7:22–37.
245. Buck M, Harrison JM, Bryce GR. An analysis of learning trials and their relationship to achievement in volleyball. J Teaching Physical Educ 1990;10:134–52.
246. Perry CL, Baranowski T, Parcel GS. How individuals, environments, and health behavior interact: social learning theory. In: Glanz K, Lewis FM, Rimer RK, eds. Health behavior and health education: theory, research, and practice. San Francisco, CA: Jossey-Bass, 1990:161–86.
247. Nelson MA. The role of physical education and children's activity in public health. Res Q Exercise Sport 1991;62(2):148–50.
248. Quinn PB, Strand B. A comparison of two instructional formats on heart rate intensity and skill development. Physical Educator 1995;52(2):62–9.
249. Li XJ, Dunham P Jr. Fitness load and exercise time in secondary physical education classes. J Teaching Physical Educ 1993;12:180–7.
250. Simons Morton BG, Taylor WC, Snider SA, Huang IW. The physical activity of fifth-grade students during physical education classes. Am J Public Health 1993;83(2):262–4.
251. Simons-Morton BG, Taylor WC, Snider SA, Huang IW, Fulton JE. Observed levels of elementary and middle school children's physical activity during physical education classes. Prev Med 1994;23:437–41.
252. Tolsma DD, Koplan JP. Health behaviors and health promotion. In: Last JM, Wallace RB, eds. Public health and preventive medicine. 13th ed. Norwalk, CT: Appleton & Lange, 1992:701–14.
253. Mullen PD, Evans D, Forster J, et al. Settings as an important dimension in health education/promotion policy, programs, and research. Health Educ Q 1995;22(3):329–45.
254. Allensworth DD. The research base for innovative practices in school health education at the secondary level. J Sch Health 1994;64(5):180–7.

255. Petlichkoff LM. Youth sport participation and withdrawal: is it simply a matter of fun? Pediatr Exercise Sci 1992;4:105–10.
256. Seefeldt V, Ewing M, Walk S. Overview of youth sports programs in the United States. Washington, DC: Carnegie Council on Adolescent Development, 1993.
257. Strong WB. Physical activity and children. Circulation 1990;81(5):1697–701.
258. Elster AB, Kuznets NJ. AMA Guidelines for Adolescent Preventive Services (GAPS): recommendations and rationale. Baltimore, MD: Williams & Wilkins, 1994.
259. Birch DA. Involving families in school health education: implications for professional preparation. J Sch Health 1994;64(7):296–9.
260. Brustad RJ. Who will go out and play? Parental and psychological influences on children's attraction to physical activity. Pediatr Exercise Sci 1993;5:210–23.
261. Nader PR, Sallis JF, Broyles SL, et al. Ethnic and gender trends for cardiovascular risk behaviors in Anglo and Mexican American children ages four to seven. J Health Educ 1995;26(2 suppl):S27–S35.
262. Haywood KM. The role of physical education in the development of active lifestyles. Res Q Exercise Sport 1991;62(2):151–6.
263. Gold RS. The science base for comprehensive school health education. In: Cortese P, Middleton K, eds. The comprehensive school health challenge. Volume 2: promoting health through education. Santa Cruz, CA: ETR Associates, 1994:545–73.
264. Burks A, Fox E. Why is inservice training essential? In: Cortese P, Middleton K, eds. The comprehensive school health challenge. Volume 2: promoting health through education. Santa Cruz, CA: ETR Associates, 1994:783–99.
265. National Association for Sport and Physical Education. National standards for beginning physical education teachers. Reston, VA: National Association for Sport and Physical Education, 1995.
266. National Task Force on the Preparation and Practice of Health Educators. A guide for the development of competency based curricula for entry level health educators. New York, NY: National Task Force for the Preparation and Practice of Health Educators, 1983.
267. Joint Committee of the Association for the Advancement of Health Education and the American School Health Association. Health instruction responsibilities and competencies for elementary (K-6) classroom teachers. J Health Educ 1992;23(6):352–4.
268. Tappe MK, Galer-Unti RA, Bailey KC. Long-term implementation of the Teenage Health Teaching Modules by trained teachers: a case study. J Sch Health 1995;65(10):411–5.
269. DuRant RH, Hergenroeder AC. Promotion of physical activity among adolescents by primary health care providers. Pediatr Exercise Sci 1994;6:448–63.
270. Small ML, Majer LS, Allensworth DD, Farquhar BK, Kann L, Pateman BC. School health services. J Sch Health 1995;65(8):319–26.
271. Brown BR Jr, Butterfield SA. Coaches: a missing link in the health care system. Am J Dis Child 1992;146:211–7.
272. Scanlan TK, Carpenter PJ, Lobel M, Simons JP. Sources of enjoyment for youth sport athletes. Pediatr Exercise Sci 1993;5:275–85.
273. McKenzie TL, Strikmiller PK, Stone EJ, et al. CATCH: physical activity process evaluation in a multicenter trial. Health Educ Q 1994;suppl 2:S73–S89.
274. Edmundson EW, Luton SC, McGraw SA, et al. CATCH: classroom process evaluation in a multicenter trial. Health Educ Q 1994;suppl 2:S27–S50.
275. National Association for Sport and Physical Education. Parent/guardian's checklist for quality sport and physical activity programs for children and youth. Reston, VA: National Association for Sport and Physical Education, n.d.
276. Nugent P, Faucette N. Marginalized voices: constructions of and responses to physical education and grading practices by students categorized as gifted or learning disabled. J Teaching Physical Educ 1995;14:418–30.

APPENDIX A: PHYSICAL ACTIVITY INFORMATION RESOURCE LIST

Several resources for promoting safe and enjoyable physical activity among young people are available from government agencies, professional organizations, and voluntary organizations. On the state and local levels, these materials might be available from affiliates of voluntary health organizations (e.g., the American Heart Association); state and local health departments; governor's councils on physical fitness and sports; state associations for health, physical education, recreation, and dance; state and local organizations that serve young people (e.g., the Young Women's Christian Association); and state physical activity contact networks. On the national level, materials can be obtained from the following agencies and organizations:

American Alliance for Health, Physical Education, Recreation, and Dance
1900 Association Drive
Reston, VA 20191-1599
(703) 476-3400
(800) 213-7193

American Cancer Society
1599 Clifton Road, NE
Atlanta, GA 30329-4251
(800) 227-2345

American Heart Association
7272 Greenville Avenue
Dallas, TX 75231-4596
(800) 242-8721

American School Health Association
PO Box 708
Kent, OH 44240-0708
(330) 678-1601

National Association for Sport and Physical Education
1900 Association Drive
Reston, VA 20191-1599
(703) 476-3410,
(800) 213-7193 ext. 410

National Association of Governor's Councils on Physical Fitness and Sports
201 South Capitol Avenue
Suite 560
Indianapolis, IN 46225
(317) 237-5630

Division of Adolescent and School Health Resource Room
National Center for Chronic Disease Prevention and Health Promotion
Centers for Disease Control and Prevention
MS K-32
4770 Buford Highway, NE
Atlanta, GA 30341-3724
(888) CDC-4NRG

National Heart, Lung, and Blood Institute Information Center
PO Box 30105
Bethesda, MD 20824-0105
(301) 251-1222

National Recreation and Park Association
2775 South Quincy Street
Suite 300
Arlington, VA 22206-2204
(703) 578-5558
(800) 649-3042

President's Council on Physical Fitness and Sports
701 Pennsylvania Avenue, NW
Suite 250
Washington, DC 20004
(202) 272-3421

The *Morbidity and Mortality Weekly Report (MMWR)* Series is prepared by the Centers for Disease Control and Prevention (CDC) and is available free of charge in electronic format and on a paid subscription basis for paper copy. To receive an electronic copy on Friday of each week, send an e-mail message to *lists@list.cdc.gov*. The body content should read *subscribe mmwr-toc*. Electronic copy also is available from CDC's World-Wide Web server at *http://www.cdc.gov/* or from CDC's file transfer protocol server at *ftp.cdc.gov*. To subscribe for paper copy, contact Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone (202) 512-1800.

Data in the weekly *MMWR* are provisional, based on weekly reports to CDC by state health departments. The reporting week concludes at close of business on Friday; compiled data on a national basis are officially released to the public on the following Friday. Address inquiries about the *MMWR* Series, including material to be considered for publication, to: Editor, *MMWR* Series, Mailstop C-08, CDC, 1600 Clifton Rd., N.E., Atlanta, GA 30333; telephone (404) 332-4555.

All material in the *MMWR* Series is in the public domain and may be used and reprinted without permission; citation as to source, however, is appreciated.